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HP Color LaserJet and HP Color Laser Jet 5/5M Printer Quick Reference Service Guide

HP Color LaserJet and HP Color LaserJet 5/5M Printer Quick Reference Service Guide

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Ordering other manuals

This *HP Color LaserJet and HP Color LaserJet 5/5M Printer Quick Reference Service Guide* has been created to help the HP LaserJet service engineer quickly troubleshoot common printer problems. While this reference is intended to provide information the service engineer will need for on-site repair of HP LaserJet color products, it is not intended to replace the service manual for any HP LaserJet color product. For detailed information about the HP LaserJet color products described in this guide, see the user guide or service manual for that product.

Service manuals for HP LaserJet products are available from Hewlett-Packard. The phone number for the Service Parts Order Desk is:

(800) 227-8164 (U.S. only)

If you are located outside of the U.S., contact your local HP Sales and Service Office. See “Training and support resources” in chapter 9.

Supported products

Name used in this guide	Model number	Maximum pages per month	Service manual part number
HP Color LaserJet/ HP Color LaserJet 5/5M	C3100A C3961A/C3962A/	30K	C3100-90916/ C3961-90955

Note

This guide will be updated as the service needs change, as new products are introduced, or as information becomes available.

Contents

1 Troubleshooting control panel messages 1

2 Cleaning and maintenance 73

3 Service Mode and diagnostics 85

4 Media specifications 115

5 Printer options and replaceable parts 121

6 Parts and part locations 125

7 Image quality 145

8 Wiring diagrams 197

9 Training and support resources 205

A Acronyms and abbreviations 213

1 Troubleshooting control panel messages

Overview

This chapter contains the following sections:

Pretroubleshooting checklist 2

Contains a list of questions to address before troubleshooting printer problems

Basic troubleshooting process 4

Includes a flowchart that provides help in solving printer hardware problems

Control panel messages 5

Provides a list of control panel messages along with solutions. Alphabetical messages are listed first, followed by numerical messages. Self-explanatory messages are not included.

Aids to troubleshooting. 61

Provides tools to help isolate the cause of many printer failures, including troubleshooting by part swapping and a self-test printout

Troubleshooting paper feed problems. 68

Provides preventive and troubleshooting techniques for paper and paper path jams

Note

If you need more detailed information, see the printer service manual.

Pretroubleshooting checklist

WARNING!

Always unplug the printer before servicing. Current is present in the main body cooling fan (M4), the noise filter board (Color LaserJet only), the AC driver board (Color LaserJet only), and the DC power supply whenever the printer is plugged in.

Before troubleshooting any specific printer problem, check the following:

- Has the printer been maintained on a regular basis (as described in Chapter 2, “Cleaning and maintenance”)?
  - Note the location of spilled or accumulated toner before troubleshooting. Toner contamination may be an indication of another problem.

Note

The customer is responsible for ensuring that the maintenance units are in good condition.

- Are all of the maintenance units within their rated life?
- Is the customer using media as specified in Chapter 4, “Media specifications” and the *HP LaserJet Family Paper Specification Guide*?
- Is the media stored correctly and within environmental limits?
- Is the printer installed on a solid, level surface?
- Has the line voltage been checked to make sure that it does not vary more than 20% from the nominal rated value specified on the power rating label?
  - Large motors used near the printer can cause temporary voltage changes.
- Is the operating environment within the parameters listed in the printer service manual?
- Is the printer protected from substances such as office cleaning materials and the ammonia gas that is produced by diazo copiers?

- Is the printer protected from direct sunlight?
- Have all non-HP components (toner, typeface cartridges, memory boards, and MIO cards) been removed from the printer?

CAUTION

Using non-HP components, such as toner, may cause permanent damage to the printer.

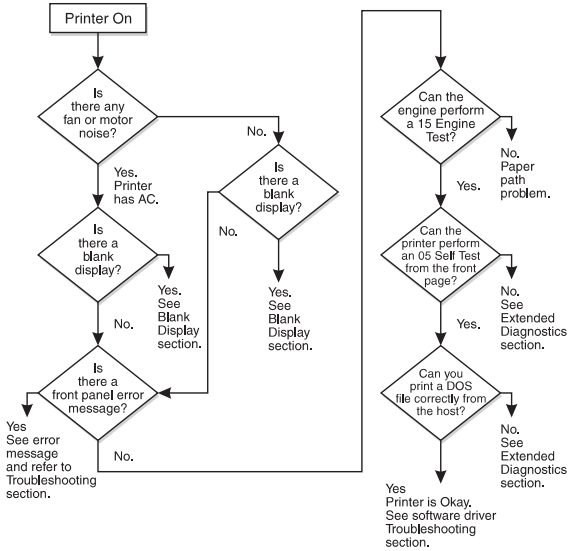
- Has the printer hardware or software configuration changed? Or could the problem be associated with any specific software?
  - Contact the Customer Care Center for software-related problems (see Chapter 9, “Training and support resources”).
- Could the problem be related to network configuration changes?
  - Remove the printer from the network and make sure that the failure is associated with the printer before beginning troubleshooting.

Basic troubleshooting process

The troubleshooting flowchart shown below highlights the process that most quickly solves printer hardware problems. During its power-on sequence, the printer verifies that its components are operating correctly. If the printer fails to turn on correctly, use the steps shown in the flowchart to troubleshoot the failure.

Note

User-accessible parts are blue-coded in the Color LaserJet and purple-coded in the Color LaserJet 5/5M.


Printer On
Is there any fan or motor noise?
No.
Yes. Printer has AC.
Is there a blank display?
No.
Yes. See Blank Display section.
Is there a blank display?
Yes. See Blank Display section.
No.
Is there a front panel error message?
Yes See error message and refer to Troubleshooting section.
No.
Can the engine perform a 15 Engine Test?
No. Paper path problem.
Yes.
Can the printer perform an 05 Self Test from the front page?
No. See Extended Diagnostics section.
Yes.
Can you print a DOS file correctly from the host?
No. See Extended Diagnostics section.
Yes
Printer is Okay. See software driver Troubleshooting section.

Troubleshooting flowchart

Control panel messages

Alphabetical messages

Blank display

- Remove the cover over the display and look in the upper right-hand corner of the vacuum florescent display (VFD). The dot should be dark. If it is white, the vacuum in the display has been lost. Replace the front panel.
- Turn off the printer. Then unplug and plug in the printer before turning the printer on again.
- Check the 5 VDC on Fuse 1 on the control PCA, as shown in “Voltage checks” in the printer service manual. The 5 VDC may be missing.
- Reseat the display connections.
- Reseat the formatter.
- Check the fuses and connectors and listen for running fans and motors when turning the printer on.
  - If no fans or motors are running, there is no AC voltage to the unit.
- Check the voltage at the test connector.
- Replace the formatter.

Config language

- Do not interrupt this installation sequence.
- This message is displayed when pressing and holding **Enter** while turning the printer on. When the power-on self-test is completed, the display language menu is available for configuration. This message is not localized.

Drum inst./drum number = xxx

- This message indicates that the printer has detected a new drum and is waiting for the user to enter the number that is printed on the bar-code label on the front of the drum. Press the **+** and **-** keys to enter this information. The number `xxx` is a whole number between 1 and 127.

Note

The drum number (or drum ID) should match the number shown on the self-test printout. (See “Understanding the self-test printout” on page 64.)

Note

If the incorrect number was entered when the `Drum inst./drum number = xxx` message appeared, it can be corrected now.

Error log

- To display this message, press and hold **Form Feed** while power-cycling the printer.
- When the power-on self-test is completed, the error log is available to use. See Chapter 7 in the printer service manual for instructions on entering the Error Log Mode. This message is not localized.

Extended diagnostics

- Use extended diagnostics to test the printer when formatter, memory (DRAM only), and MIO-related errors persist. The extended diagnostics test exercises the ability of the formatter to communicate across the MIO and with the memory. To perform the extended diagnostics tests, see “Extended diagnostics” on page 110.

FE font cart err/cycle power

Color LaserJet only

- The font cartridge was removed while the printer was online.
  - This error occurs whether or not the cartridge was being accessed.
  - Power cycle the printer to clear this error.

Initializing NVRAM

- This message occurs when NVRAM must be initialized because one or more values are incorrect.
- After the initialization is complete, the printer self-test message appears.

Note

This message should only appear when the printer is turned on. It should never appear during normal printer operation.

Installing new developer

Note

Do not interrupt this installation sequence.

- The new developer sequence has started.
  - The installation sequence lasts about 3 minutes for the black developer and 9 minutes for the color developer.

No fonts top/bottom/both font cartridge

Color LaserJet only

- The printer is not reading some (or all) of the indicated cartridges.
  - To clear this error, reinsert the specified font cartridge and press **Online**.
- If the message persists, the indicated cartridge is bad and should be replaced.

Please verify drum number = xxx

- Re-enter the drum number for verification.
  - Press the + and - keys to change the displayed number. If the incorrect number was entered when the `Drum inst. drum number + xxx` message appeared, it can be corrected now.
  - This verifies that the correct number was entered.

Reinsert top/bottom/both font cartridge

Color LaserJet only

- Any or all of the font cartridges were removed while the printer was offline and contained buffered data.
- Clear this error by reinserting the specified cartridge(s) and pressing **Online**.

Service Mode

- Service Mode is used to test printer functions by issuing commands to the control PCA through the control panel. For more information on this display panel message, see “Accessing Service Mode” on page 87.

11.x Front tray empty

- The paper tray is not installed, or the tray is empty.
  - Load paper.
  - Check the paper-size detect board.
  - Check that the switch actuators (on the tray) are not damaged.

11.4 Front tray empty

- The paper-out photosensor (PS8) senses an empty tray.
- If paper is in the tray, the sensor arm could be stuck or broken. Troubleshoot PS8 as follows:

  1 Remove the paper tray and open the top cover.

  2 Check that the paper-size switch actuators on the tray are not damaged.

  3 Check that PS8 is free throughout its entire range of travel and is properly located in its mount.

  4 Check that connector CN802 (on the controller) is fully seated.

  5 If the error persists, perform the PS8 Service Mode Test as described below.

PS8 Service Mode test

- PS8, the paper-out photosensor, can be tested in Service Mode as follows:

  1 Enter Service Mode (see “Accessing Service Mode” on page 87) and select the Status Test Mode.

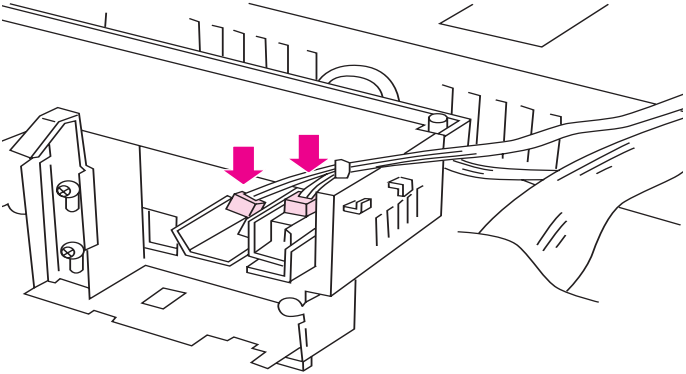
  2 Enter the PS8 test address (10) and press **Enter**.

  3 With no tray installed, the display will read 0 for paper tray empty.

  4 Open the printer, lift the paper guide, and move the sensor shaft through its range of motion.

  5 The display should change from low to high (0 to 1) as the photosensor is activated. If it does not change, check that the PS8 connector on the high-voltage power supply (HVPS) is fully seated, as shown in the figure below. (The connectors are on the back of the HVPS.)

  6 Replace the photosensor.



Photosensor PS8 connections on HVPS (HVPS inverted)

11.X Rear tray empty

- Check that the rear feed unit (RFU) is installed and that it has paper in it.
- Remove the RFU and check that the connector is not damaged.
- Remove and reseat the RFU if paper is present.

Note

Do not remove or install the RFU when the power is on. The printer only checks for the presence of the RFU when the printer is turned on.

12 Close top or side door

- The printer's top or side door is open or the door sensor has failed.
  – Close the top or side door or replace the door sensor.
- One of the two interlock switches (MS2 or MS3) may be defective. If the following test proves that the switches are defective, replace the interlock switch assembly as shown in Chapter 6 of the printer service manual.

Note

Power cycle the printer and re-close both doors to confirm the message before troubleshooting.

Test the interlock switch

WARNING!

Do not inhibit the free movement of the interlock switch. If this mechanism is blocked, voltage may be present when the top cover is open.

1 Open and close the top cover. If the message remains, open and close the side door.

2 Open the side door and push the interlock mechanism with a flat-blade screwdriver (see "Testing the interlock switches" on page 7-21 of the service manual), while running test 41 from Service Mode (see Chapter 3).

3 If the message persists, remove the top cover and check that the switch linkage is not bent.

4 Check that the switch connectors are in good repair. Toggle the switches by pressing down on the metal tab over the switches.

5 If the linkage is not damaged, remove the switch assembly and test it with an ohmmeter.

6 Replace the assembly if it is defective.

13.1 Clear drum winding jam

Note

The locations of all sensors are identified on page 139.

- Paper is detected in the out of limit area of the print drum. The drum-winding jam sensor indicates that paper is beginning to wrap around the print drum.
  - Turn the paper stack over end-to-end.
  - Check that the paper meets HP paper specifications for the printer.
  - Check that media is not being re-fed into the printer.
  - Check that the drum-wrap sensor is not blocked by opening the side door and checking for paper wrapped around the drum.
- If no paper is seen, calibrate the drum-winding jam sensor by entering into Service Mode (see “Accessing Service Mode” on page 87“) and running test 47.
- See “Troubleshooting paper feed problems” on page 68.

13.2 Clear output jam

Note

The locations of all sensors are identified on page 139.

- Print media is jammed in the exit assembly because it failed to clear the exit sensor (PS1) in the allotted time.
  - Check that the sensor flag moves freely and that the sensor is free of paper dust.
  - Check that media is not in the sensor when the printer is turned on.
  - Test the operation of the sensors by entering Service Mode (see “Accessing Service Mode” on page 87“) and running test 22.
- See “Troubleshooting paper feed problems” on page 68.

13.4 Clear front tray input jam

Note

The locations of all sensors are identified on page 139.

- The printer detects a paper jam in the front tray area.
  - Clear the front tray area.
- The paper failed to arrive at PS7 within the allotted time after SL1 (the paper feed solenoid) was engaged.
  - Inspect the input and registration area for media. Transparencies can be especially difficult to see.
  - Test the operation of the sensors by entering Service Mode (see “Accessing Service Mode” on page 87“) and running test 20.
- See “Troubleshooting paper feed problems” on page 68.

13.5 Clear fuser jam (CLJ)
13.5 Clear paper jam (CLJ5)

- Paper did not arrive at PS1 (exit sensor) in the allotted time. (See the diagram on page 141 for the location of PS1.)
  - Check that PS1 is free throughout its entire range of travel and that media is not at the sensor when the printer is turned on.
  - Check for paper dust in the sensor.
  - Check to see if media has cleared the registration plate. If media is present, check the operation of the registration plate solenoid by running test 25 from the status and test section of the printer service manual.
- Check to see if the transfer assembly is installed correctly.
- Test the interlock switch. (For instructions, see the section called “To test the interlock switch” under error message 12 on page 11.)
- See “Troubleshooting paper feed problems” on page 68.

13.6 Clear rear tray input jam

- The printer detects paper in the rear input area.
  – Clear the RFU.
- The sensor (PS4) did not activate within the allotted time after M7 started. (See the diagram on page 142 for the location of PS4.)
  – Repair the sensor.
  – Check that PS4 is not blocked.
- Sensor PS4, the RFU paper sensor, failed to detect paper media within the allotted time.
  – Check that the sensor is not stuck.
  – Check if media has been picked from the tray.
- Verify that the RFU is properly adjusted for the loaded media.
- See “Troubleshooting paper feed problems” on page 68.

13.7 Clear rear tray paper jam

Note

The locations of all sensors are identified on page 140.

- The printer detects a paper jam at the rear input area. This message indicates that the paper was picked, but did not arrive at the registration area (PS7), in the allotted time.
  – Clear the jam and check the paper feed rollers.
  – Check that sensor PS4 is not defective and that it is free throughout its travel.
- See “Troubleshooting paper feed problems” on page 68.

13.8 Clear paper jam

- Paper is jammed in the paper registration area.
  – Open the printer and remove the jammed paper.
- Paper may be on PS7 when the printer is turned on. (See the diagram on page 141 for the location of PS7.)
  – Check that PS7 is free.
- See “Troubleshooting paper feed problems” on page 68.

13.8 Internal paper jam during warm-up

- Media was detected in the printer during warm up.
  - Open the top cover and clear any media found inside the printer.
  - If no media is found in the printer, check all sensors by running the tests described under error messages 13.1, 13.2, 13.4, and 13.5.
- Verify that all paper path sensors are not blocked and that the detection flags are free throughout their travel.
- See “Troubleshooting paper feed problems” on page 68.

14.5 Replace collection box
16.5 Replace collection box

- Remove the toner collection box from the OPC drum assembly and inspect the flexible diaphragm (in the top surface of the collection box).
  - If the diaphragm has been pushed above the collection box surface by accumulated toner, the box is full. In this case, the collection box must be replaced. Do not attempt to push the diaphragm down to correct this condition.
- The excess toner collection box is monitored by PS3. (See the diagram on page 141 for the location of PS3.) Perform the sensor checks below to isolate the problem.

Toner collection box full sensor tests

1 Power cycle the printer.

2 Open the top cover and lower the print drum.

3 Pull the toner collection box out of the drum assembly.

4 Verify that the toner-full flag is moving freely (it should raise up as you are pulling the toner collection box out of the assembly and drop down once the collection box is removed).

5 Check to see if the toner collection box is full. If the toner collection box is full, the diaphragm will be pushed out. If it is pushed out, then the collection box is full and needs to be replaced.

CAUTION

Do not try to continue using the toner collection box by pushing the diaphragm down.

6 Check that the PS3 sensor is fully seated, clean, and connected properly. (See the diagram on page 141 for the location of PS3.)

If these tests are not effective, perform the PS3 Service Mode test described below.

Note

If the collection box is overfilled, the printer may need a thorough cleaning. In addition, the excess toner auger (inside the print drum) may be compacted or broken. The print drum may have to be replaced.

PS3 Service Mode test

Note

The PS3 sensor flag is not accessible to toggle by hand. You must have an empty collection box to perform this test.

1 Power cycle the printer and enter the Service Mode (see “Accessing Service Mode” in Chapter 3.)

2 Select the status and test Mode of the Service menu.

3 Enter the PS3 test address (55), and press **Enter**.

4 Install the empty collection box. If the display is high (1), the sensor is stuck or defective.

5 If the display is low (0), pull out the collection box about an inch to make the sensor flag rise. If the display does not change from 0 to 1, the sensor flag is stuck or broken or the sensor (PS3) is dislodged or defective.

6 Check connector CN904 on the toner sensor PCA (Color LaserJet only).

14.6 Replace coating kit

- If this message does not clear when the coating pad kit is replaced, the fusible link in the coating pad may not be contacting the leaf spring in the fusing assembly or a coating kit with a blown fuse has been installed.
  – Reseat the coating pad.

Color LaserJet only

- If a new style fusing assembly with a purple handle has been installed, then the fusible-link contacts are not making proper electrical contact with the contact fusing spring assembly.
  – Reseat the cleaning roller.

CAUTION

The printer should continue to print when returned online. The fuser and main drive may be damaged if the oil pad and cleaning roller are not replaced as soon as possible.

16.5 Replace collection box

- See “14.5 Replace collection box.”

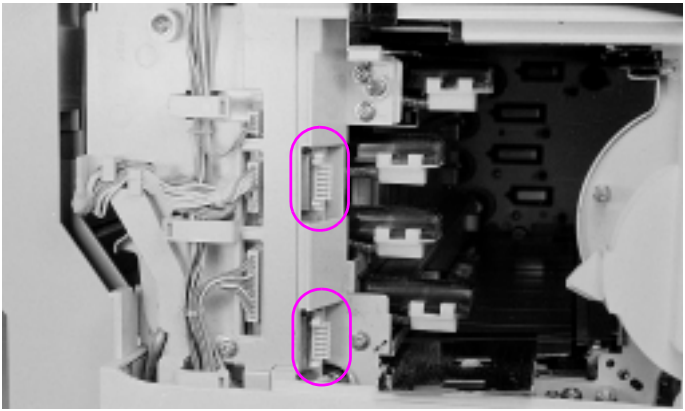
17.1 Install developer
17.2 Install developer

- The printer failed to detect either the black developer (for the 17.1 message) or the color developer (for the 17.2 message).
  – If the developer is not installed, install it.

1 Power cycle the printer.

2 If the message persists, remove the suspected developer and inspect the blade connectors that insert into the toner sensor PCA. Check that they are clean and straight. Also check the toner sensor PCA connectors.

3 Re-install the developer.



Toner sensor PCA connections (circled)

4 Check all the connectors on the toner sensor PCA. Ensure that they are all fully seated.

5 Check the wiring behind the power supply drawer for nicks or cuts that may cause the signal line to short to ground. Reseat the connectors if any are suspect.

6 Replace the toner sensor PCA if necessary.

7 If steps 1 through 6 do not resolve the problem, replace the developer.

17.4 Install fuser

- The fuser is not installed, or the printer failed to detect the fuser.

1 Power cycle the printer.

2 If the message persists, remove and reseat the fuser.

3 Check that the fuser connectors are not damaged (no bent or broken pins).

4 Check that nothing prevents the fuser from fully seating into its plug.

5 Check the connector (CN105) at the control PCA.

6 Replace the fuser.

7 Replace the control PCA if necessary.

17.6 Install collection box

- The toner collection box or the print drum is not installed or is not detected. The switches that post this message are inside the print drum cartridge and cannot be tested directly.

1 Power cycle the printer to clear the message.

With the printer turned off and unplugged, inspect the print drum connector (see the figure under “17.8 Reinstall drum”). Ensure that the connections are not bent and that both the male and female ends are in good repair and clean.

2 Ensure that nothing inhibits the print drum from fully seating into the connection.

3 Check that CN101 on the control PCA and CN 254 on top of the developer bias supply are fully seated.

4 Reseat the collection box and listen for an audible click.

5 If the collection box does not click into place, the leaf spring inside the housing may be defective. Replace the print drum.

6 Remove the drum and very carefully clean the inside of the sensor, using a cotton swab and isopropyl alcohol.

7 Re-install the drum.

17.7 Remove drum cover

- The protective shipping cover for the print drum has not been removed.
  - Remove the drum cover (see the printer service manual for instructions) or clear the drum wrap sensor.
- If the error persists, perform the status and test checks (see the printer service manual) to test the drum wrap sensor.
- If the error still persists, perform the drum reflectance calibration (Service Mode status and test address 47). Also see the procedures for the 66.1 Jam sensor service message.

17.8 Reinstall drum

- This message indicates that the drum-winding sensor output is abnormal during printing (see 66.1 Jam sensor error message).
- A jam sensor could be broken or defective, or a connection could be loose.

1 Remove the print drum and inspect both sides of the connector as shown in the “Print drum connector” figure below.

2 Re-install the print drum. Check that nothing prevents the print drum from being fully seated into the printer.

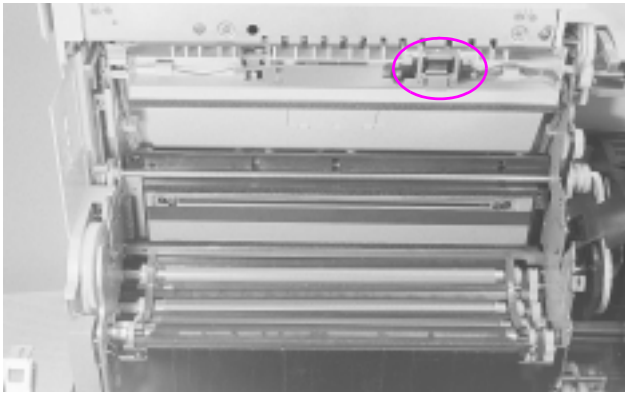
Note

If the drum assembly is for a Color LaserJet 5/5M (the assembly will be purple-coded), you will need to make sure the corona cleaning lever on the drum is fully seated to the right.

3 Power cycle the printer.

4 Run test 47 in Service Mode (see Chapter 3 for information on accessing Service Mode).

5 Replace the drum cartridge assembly.



Print drum connector (circled).

17.9 Reinstall fuser

- The fuser did not warm up correctly.
  - Reseat the fuser.
- The fuser connection is not stable.

WARNING!

The fuser is HOT. Turn off the printer to allow the fuser to cool for at least 30 minutes before beginning this procedure.

  - Power cycle the printer to clear the message.
- If the message persists:
  - Remove the fuser. Check that all the connectors are straight and clean.
  - Reseat the fuser, being certain that all the connectors make contact.
- If the message persists, replace the fuser.

18.1 Clean transfer corona wire

- The paper-charging brush or the bias roller in the transfer assembly is arcing.
  - Power cycle the printer.
  - Clean the transfer corona wire (see Chapter 2, “Cleaning and maintenance”).
  - Check connector CN701 on the control PCA and connector CN702 on the HVPS.
  - Replace the transfer assembly and try another test print.
  - Replace the HVPS.

18.2 Reinstall drum

- The printer sensed a high-voltage leak in the print drum neutralizing corona.
  - Power cycle the printer to clear this error.
  - Remove and reinstall the print drum. Try a test print.
  - Check connector CN731 on the control PCA and connector CN730 on the HVPS.
  - Check the neutralizing corona contact for damage or contamination. (see the “Neutralizing corona contacts” figure below.)
  - Replace the print drum.
  - Replace the HVPS.
- The neutralizing corona may have arced.
  - Clean the printer.

Neutralizing corona contacts (circled)

18.3 Reinsert developers

- The printer detected a high-voltage leak in the developer bias power supply. (Although this is a developer bias fault, the print drum is often the root cause of this failure.)
- The developer is not turning.

1 Remove each developer and check their pin contacts.

2 Check that each of the high voltage contacts on the developer bias assembly is clean and located correctly.

3 Print several self-tests and look for repetitive defects. Replace the print drum if repetitive defects appear.

4 Remove the print drum and check its surface for any bright metallic spots, dents, or defects that may indicate an arcing point (anywhere in the green area). Replace the print drum if any defects are found.

5 Check CN601 on the developer bias supply and CN600 on the control PCA.

6 Try a test print.

- If the message persists, replace the print drum followed by the color developer and the black developer if necessary.

7 Replace the developer bias power supply.

18.4 Clean transfer corona

- There is a high-voltage leak in the transfer belt, print drum, or HVPS.
  – Power cycle the printer.

Note

If the problem will not repeat dependably, print transparencies in color. Transparencies print at a slower speed with a higher transfer current.

- Clean the transfer corona (see Chapter 2, “Cleaning and maintenance”).
- Check that the print drum contacts are clean.
- Remove the transfer belt assembly and print a test page.
- If a 13.x Paper jam message appears when printing without the transfer assembly installed, the high-voltage leak is associated with the transfer assembly.
  – Check the transfer assembly contacts for proper alignment, corrosion, etc. before replacing them.
- If the error persists, reseat the print drum. Then replace the print drum followed by the HVPS if necessary.

18.5 Reinsert developers
18.6 Reinsert developers

Note

18.5 Reinsert developers is for black developers.
18.6 Reinsert developers is for color developers.

Note

Do not replace developers until the actual cause has been identified. Replace the developers only if they are proven defective.

- The printer does not sense the changing output from the toner concentration sensor that occurs with normal toner movement within the developers.
  - The developer is not selected.
  - The developer drive gears are not engaging the developer.
  - The developer drive gears do not rotate.
  - The developer is not rotating.
- Reinsert the developer.

Note

If new developers are installed in the printer, toner compaction may cause the toner concentration sensor to give an abnormal reading. Remove the new developer, shake it as described in Chapter 4 of the printer service manual, and reinstall.

- Perform the following procedure to troubleshoot the 18.5 and 18.6 message:

  1 Remove the developers and check that the drive and gears are not worn and that no teeth are missing.

  2 Remove the developer assemblies and print drum. Move the top cover up and down. Check that the developer drive gears extend and retract and are free throughout their travel. With the top cover partially closed, press each developer drive gear and check that each has firm spring pressure.

  3 Rotate the gears on each developer assembly by hand (this requires some force). Check that they all have similar resistance. If the gears will not turn, replace the developer.

  4 Shake the developer as shown in chapter 4 of the service manual. Toner may be compacted inside the developer.

5 Examine the connectors on the developer and the toner sensor PCA for damaged pins or connectors.

6 If symptoms still persist, follow the procedures listed below.

Service Mode tests

- Use Service Mode to check that the developers are rotating. This test is especially useful because the status Mode displays the toner concentration value while the developer augers rotate. To perform this test, follow the steps below.

CAUTION

Do not perform this test with the RFU installed. Performing this test with the RFU installed and the toner hopper cover removed will damage the toner feed augers.

1 Enter Service Mode (see “Accessing Service Mode” in Chapter 3).

2 From the Status and Test Mode, select address 08.

3 Select subtest 0 for the 18.5 message, or address 1, 2, or 3 for the 18.6 message. Once selected, press **Online** to start the test. When the test starts, the control panel displays the toner concentration value for the selected developer. If the developer drive gear rotates, the toner concentration sensor value displayed on the control panel should fluctuate slightly.

4 If the gears do not rotate, check the developer rotation as follows:

A Remove the RFU, if installed.

B Remove the toner hopper cover.

C Run the Service Mode test again.

D Watch the developer drive gears at the rear of the printer. They should turn when the test is started. Make sure you are looking at the developer drive gear and the developer gear during this test. (The black drive gear is the most difficult to see.)

E If the gears do not rotate, perform the mechanism alignment checks.

5 If the gears rotate and the toner concentration sensor value does not fluctuate, check the electrical connections between the developer and the control PCA.

6 If the electrical connections are OK, replace the toner sensor PCA.

7 If the message persists, replace the developer.

Mechanism alignment checks

- Misalignment between the developer drive assembly, the toner hopper assembly, and the printer frame may cause 18.5 and 18.6 errors. Check the following items for alignment when troubleshooting this error.

1 Remove the developer and check to see if the developer casing is bent. To do so, follow these instructions:

A Place the developer on a flat surface with the back of the developer toward you.

B Push the developer forward inside the casing.

C If the developers do not move forward until the bias contact pin is against the casing on the left side, the casing is bent.

D Replace the developer assembly.

5 The printer frame has detents that position the developer drive assembly correctly on the printer frame. Ensure that the assembly is properly seated on these detents. Improper seating will misalign the developer drive assembly with the developers and the toner hopper assembly. If misaligned, loosen the screws, align the developer drive assembly on the detents, and then tighten the screws.

6 The developer drive assembly aligns with the toner hopper assembly through an alignment pin located on the developer drive assembly. Check that the alignment pin is straight and that the toner hopper is fully seated. If the alignment pin is bent, replace the developer drive assembly.

7 If the alignment pin is not damaged, remove the screws that hold the toner hopper in place, and then:

A Slide the toner hopper towards the left side of the printer (to the right when viewed from the rear of the printer).

B Check the gear cluster on the toner hopper for bent sheet metal. If the toner hopper select shaft is out of its bushing or if the bushing is not mounted correctly in the sheet metal, the sheet metal may be bent. If the gear cluster is damaged, replace the toner hopper assembly.

C Check to see if the activation arms for the toner hopper lockout fingers are against the select cams. If the arms are on the cams, check the toner hopper lock solenoid (SL6), located on the left side of the toner hopper, for binding and correct operation.

D If the toner hopper assembly is functioning correctly, slide the assembly back into position. Align it with the developer drive assembly being careful not to damage the gear cluster. Reinstall the toner hopper screws.

19.x User maintenance

- A printer consumable has exceeded its maximum life. Press **Online** to continue. The printer will continue to print, but print quality will degrade until the indicated consumable is replaced.

CAUTION

The main drive gears could become damaged if the fuser is allowed to remain past its maximum life in the printer.

- If the indicated consumable has been replaced:

  1 Reseat the consumable.

  2 Check both sides of the connector for bent pins.

  3 Power cycle the printer.

  4 Verify that the fuse for the consumable is not blown. The drum, developers, transfer, fuser, and coating kit are fused. If the fuse is blown when a new consumable is installed in the printer, the consumable will not be detected as a “new” part.

Note

Do not return a consumable to stock once the fuse is blown.

  5 Try another of the indicated consumables.

  6 Check the self-test print for any value that is inconsistent with the perceived actual cumulative usage. If a value is suspect, investigate the possibility of a NVRAM problem. If necessary, contact your local response center.

20 Memory overflow

- More data has been received from the host than fits in internal memory.
  - Press **Online** to continue printing. Only the data that fits in printer memory is printed.
- If the message persists, install more memory.

21 Memory out

- The printer has run out of memory. Imaging the current job cannot continue until the engine clears memory.
  - Press **Online** to clear memory. This results in data loss.
- If this error persists, install additional memory.

22 I/O config error

- The computer is not obeying the pacing mechanism of the MIO link. This causes the printer's receiving buffer to overflow during a busy state.

23 MIO not ready

- The MIO card cannot accept data.
  - Print the self-test page for more information.
  - The MIO card could be defective.
- If the message persists, reseat the MIO card and ensure it is properly connected to the network. If necessary, replace the MIO card.

24 Busy moving toner

- The printer is adding toner to the developers. If this message is displayed frequently, check for faint print. If several pages of heavy toner coverage are being printed, this message may not indicate an error. If the message persists, the toner feed auger may not be turning or a toner sensor may be defective.

1 Power cycle the printer.

2 Check the toner level in the toner hopper assembly by manually opening each hopper. If any of the hoppers are completely empty, the toner sensor for the empty hopper may be defective. Use the Service Mode status and test (address 01) to test the toner level sensors.

Note

The toner sensors on the hoppers are piezo-electric. When the toner falls below the level of the sensor, the sensor output is audible. However, the high-pitched sound may be out of hearing range for some people.

3 If the hoppers have enough toner to cover the sensor, and the message persists, check the toner hopper auger operation as follows:

A Remove the RFU.

B Manually open the hoppers and watch the paddles while printing the demo page.

C If the paddles turn, the problem is in the hopper augers. Replace the toner hopper assembly.

D If the paddles do not turn, print the demo page 10 times. Watch that the toner hopper supply shaft rotates, that the hopper select shaft engages the hopper clutch, and that the toner supply augers turn.

E If the toner supply shaft does not rotate, perform the toner supply solenoid test as described below.

Toner supply solenoid test

Test the toner supply solenoid (SL3) and supply augers as follows:

1 Enter the Service Mode (see “Accessing Service Mode” in Chapter 3) and select test address 52.

2 Remove the RFU and the back cover. Listen for the solenoid to actuate.

30 PostScript error xx

- The printer encountered a PostScript error indicated by XX.
  – Press **Online** to continue. The current job is canceled.

Note

For PostScript errors, look at the program that is being sent, rather than at the printer unless every PostScript file comes up with the same error.

30 PostScript error 00

- An attempt was made to add an item to a dictionary that is full. This may be a driver incompatibility problem.
  – Select a different PostScript driver and resend the print job.

30 PostScript error 01

- An attempt was made to place too many dictionaries on the dictionary stack. This may be a driver incompatibility problem.
  – Select a different PostScript driver and resend the print job.

30 PostScript error 02

- An attempt was made to remove more dictionaries from the dictionary stack than were available. This may be a driver incompatibility problem.
  – Select a different PostScript driver and resend the print job.

30 PostScript error 03

- The execution stack is too large. Procedure invocation is nested deeper than PostScript allows. This may be a driver incompatibility problem.
  - Select a different PostScript driver and resend the print job.

30 PostScript error 04

- An attempt was made to access an array, dictionary, file, or string object incorrectly.

30 PostScript error 05

- An incorrect exit was executed.

30 PostScript error 06

- An incorrect access string specification to the file operator occurred.

30 PostScript error 07

- The operand to make font or set font is not a well formed font dictionary.

30 PostScript error 08

- An incorrect restore was attempted.

30 PostScript error 09

- An error occurred during the execution of one or more of the file operators.

30 PostScript error 10

- A PostScript implementation limit was exceeded.

30 PostScript error 11

- An operator requiring a current point was exceeded while the current path was empty.

30 PostScript error 12

- A numeric operand’s value is out of range.

30 PostScript error 13

- An attempt was made to push too many objects on the operand stack.

30 PostScript error 14

- An attempt was made to pop an item from an empty operand stack.

30 PostScript error 15

- The PostScript scanner encountered text that does not conform to the PostScript syntax rules.

30 PostScript error 16

- The PostScript interpreter timed out waiting for the user to manually feed paper, waiting for data from the computer, or because a job took too long to complete.

30 PostScript error 17

- An operand was encountered that is not the correct type, such as a number when a string is required.

30 PostScript error 18

- A name was encountered that cannot be found since it was previously undefined.

30 PostScript error 19

- A file identified by a name string operand of the file or run operators cannot be found or opened.

30 PostScript error 20

- An overflow, underflow, or meaningless result of a numeric calculation (such as division by zero) occurred.

30 PostScript error 21

- A clear-to-mark or count-to-mark operator could not find the required mark on the stack.

30 PostScript error 22

- An operator object was executed for which the interpreter has no built in action.

30 PostScript error 23

- An error occurred in virtual memory.

30 PostScript error 24

- The systemdict quit operator was executed causing the PostScript interpreter to re-initialize virtual memory. All non-persistent information was lost.

30 PostScript error 25

- A PostScript firmware failure occurred. This is associated with normal error handling and not with hardware.

30 PostScript error 26

- A “setpagedevice” request cannot be satisfied.

30 PostScript error 27

- An external interrupt request was received by the PostScript interpreter.

30 PostScript error 28

- A named resource sought by the findresource operator does not exist.

40 I/O data error

- A data error has occurred while receiving data from the computer. Press **Online** to continue printing. Check the connection between the printer and computer.

48 Invalid job/aborting job

- The printer does not recognize the language it is being switched to.
  - This message remains in the display until it receives a valid language.

50.x Fuser service

- The printer senses that the fuser temperature is incorrect for the application. The voltage read at the upper fusing roller thermistor momentarily exceeded the limit. Leave the printer on for 20 minutes (this gives the internal clock time to count down and reset) and then power cycle the printer to clear this message. This message can also be reset by going into the service Mode, register adjust, and setting address 47 to 00. If the message persists:
- Check that the fuser connector is in good repair (no bent or broken pins).
- Open and close both doors during the warm-up period. If the message appears immediately, replace the fuser.
- Make certain the fuser can be fully seated into the printer and that toner has not accumulated around the fuser area.

- Check the connectors on the fuser, and check the connectors in the printer that interface with these fuser connectors.
- Check connector CN105. CN105 is labeled on the control PCA. (See the main wiring diagram in Chapter 8).
- Replace the fusing assembly.

50.1 Fuser service error

- The fuser temperature is too high for the application.
  - Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the Service Mode to reset this message.
  - Check the fuser connections.

50.2 Fuser service error

- The fuser temperature is too low for the application.
  - Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the Service Mode to reset this message.
  - Check the fuser connections.

50.3 Fuser service error

- The fuser temperature sensor is open.
  - Leave the power on for 20 minutes while the printer counts down, then power cycle the printer to clear this error or use address 47 in the register adjust section of the Service Mode to reset this message.
  - Check the fuser connections.

50.4 Fuser service error

- There is a fuser temperature error caused by erratic sensor values.
  - Leave the power on for 20 minutes, and then power cycle the printer to clear this error or use address 47 in the register adjust section of the Service Mode to reset this message.

52.1 Engine NVRAM error

- This error indicates a failure to read the NVRAM on the control PCA. To troubleshoot this problem:

1 Power cycle the printer.

2 If for some reason the NVRAM was removed from its socket, ensure that there are no bent pins and that they are all in their correct position.

3 If the error persists, contact your local response center for assistance in evaluating NVRAM viability.

52.2 Engine NVRAM error

- A developer with a blown fuse is being installed into a new printer.
- The NVRAM data could be corrupt.
  - The printer checks an address in NVRAM for the status of the engine. If the status returned is new, then the printer checks the developers to see if the fuses are new (closed). If the fuses have been blown, then the `52.2 error` is displayed. To check if the fuses are blown on the developers use an ohmmeter across pins 5 and 6 on the color developer, and pins 4 and 6 on the black developer (see the main wiring diagram in Chapter 8). (Pin 1 is at the bottom of each connector.) If either developer has a blown fuse, replace the developer.
- If the printer is new, replace the developer. If the printer is not new, troubleshoot as 52.1 Engine NVRAM error.

53 Laser error

- The printer has detected a laser diode error.
  – Power cycle the printer.
- If the error persists, reseat connectors CN300 and CN101. (See Chapter 8, “Wiring diagrams” for the locations of these connectors.)
- If the connectors are in good repair, replace the laser scanner assembly.

53 Laser error/service

- The laser signal is unstable.

1 Press **Online** to continue.

2 Power cycle the printer.

3 Open, then close the side door.

4 Check the side door interlock.

54.x Engine error/service error

The engine reported one of five types of failures or errors as listed below. Try to clear the errors by pressing **Online**. If the message persists, perform the appropriate procedure described below for the applicable 54 error message.

54.1 Engine error/service

- The scanner motor (M6) did not reach the correct speed in the allotted time.
  – Power cycle the printer.
- If the motor spins up and the error persists, perform the following procedure.

1 Check CN104 and CN350 on the optics assembly.

2 Inspect the wires behind the power supply drawer for nicks or cuts on the insulation.

3 Measure the 24V DC.

4 Replace the laser scanner assembly.

5 Replace the control PCA.

54.2 Engine error/service

- The printer detected an error in the 24V DC supply.
  – Power cycle the printer to clear the error.
- If the error persists, check the 24V DC line.
  – If the 24V DC voltage is missing, replace the DC power supply.

Note

The actual measured voltage should be approximately 22V DC.

- A defective or misaligned interlock switch can also cause this error.
  – Use a screwdriver to push the interlock mechanism in the direction shown in the printer service manual, page 7-21, Figure 7-4.
- If the message clears, adjust the tab on the side door which operates the interlock mechanism.
- If the message persists, turn off the printer and check the interlock mechanism, connectors, and cabling.
- Check fuse F5 on the DC power supply and fuse F2 on the control PCA.

54.3 Engine error/service

Note

Do not replace any developers until the cause of the error is identified. Replacing developers without identifying the cause of the error will only mask the problem and could lead to another service call from the customer.

- A toner concentration error occurs when the toner concentration sensor reading is at a minimum or maximum value. This error can be caused by:
  – a defective toner concentration sensor
  – failure of the toner hopper sensor or toner supply mechanism
  – too much or too little toner in the developer

– a defective toner sensor PCA
– incorrect NVRAM values. Incorrect NVRAM values can be caused by:
  - not installing the correct NVRAM on the control PCA
  - installing the NVRAM incorrectly
  - a defective NVRAM
  - installing a used developer.

Incorrect NVRAM values usually cause too much toner to be delivered to the developer. Failure of the toner hopper sensor or toner supply mechanism is usually associated with not enough toner being delivered to the developer. To determine the cause of this error follow the steps below:

1 Power cycle the printer.

2 Run several self-test pages to see if the error returns. You should be able to print at least one self-test page before the 54.3 error message reappears.

3 If the error returns, look at the self-test page and check for faded or bold colors.

4 If a color looks faded, the problem will most likely be associated with a defective toner hopper sensor or the toner supply mechanism. If any color looks bold, then too much toner may have been added to a developer.

5 To identify which developer is reporting the error, run the toner concentration test shown below. A value of 127 or 63 on the front panel is an indicator for the developer reporting the error.

6 See “Faint print” on page 157 for the procedure to troubleshoot a problem with faded print.

7 If a color looks bold on the self-test page, the problem can be caused by one of the following:

– an incorrect NVRAM value
– the wrong NVRAM was installed on the control PCA
– a developer, which is not the most recent one to be initialized by the printer, has been installed

- The NVRAM values correspond to the last developer that was initialized in the printer. Even if the developer currently installed was initialized in the printer, if it was not the last developer initialized, the NVRAM values are not correct.

8 If the wrong developer was installed, reinstall the correct developer.

9 If the wrong NVRAM was installed, reinstall the correct NVRAM.

10 If the correct NVRAM or the correct developer(s) is not available, a new developer(s) must be initialized in the printer.

11 For other NVRAM associated problems, contact your local response center.

Toner concentration test

Note

The toner concentration test is useful whenever the printed page displays characteristics of having either low toner concentration or high toner concentration. The procedures to correct low and high toner concentration are discussed later in this chapter.

1 Print a self-test page and note the relative humidity reading.

2 Power cycle the printer and enter the Service MODE (see “Accessing Service Mode” in Chapter 3). Select the Register Adjust function of the Service Mode (see Chapter 3 for instructions on the register adjust function) to obtain the data values contained in the NVRAM addresses listed below.

NVRAM addresses

Color	Black			Yellow			Magenta			Cyan		
Address	30	29	28	33	32	31	36	35	34	39	38	37
Data Example:	AA 00	BB 16	CC 23	AA 00	BB 08	CC 28	AA 00	BB 08	CC 28	AA 00	BB 08	CC 15
Page count	AABBCC			AABBCC			AABBCC			AABBCC		

3 Press the **Form Feed** and **Reset** keys to select the desired NVRAM address. When the desired NVRAM address is displayed, press **Enter** to display the value held at that address. For example, if the displayed NVRAM address is 29 and the value held at that address is 18, then the display will read:

```
Current Value
029 ReadOnly 18
```

Record the address and the value it contains. To clear this display and toggle back to `Enter Address xxx`, press **Enter** again. Repeat this procedure until the NVRAM values for all of the addresses in the “NVRAM addresses” table have been obtained and recorded.

4 The current cumulative page counts for each of the developers can now be constructed from the data you have obtained. See the following examples:

Examples:

Address: 30=00, Address 29-16 and Address 28-23. The black page count is 001623.

Address 33=00. Address 32=08 and Address 31=28. The yellow page count is 000828.

Address 36=00. Address 35=08 and Address 34=28. The magenta page count is 000828.

Address 39=00. Address 38=08 and Address 37=15. The cyan page count is 000815.

Note

Do not use the black and color page counts from the self-test page (these counts indicate the total cumulative page counts for the printer, which are usually different than the page counts for the developers).

5 Power cycle the printer and enter Service Mode again. Select the status and test function from the Engine Service Status/Test Mode.

6 Follow the Status and Test Mode flow charts (pages 88 and 90 until you come to the `Enter Address AB` display. Press **Form Feed** several times to increment to AB = 08 (see the toner concentration values table on page 43).This sets the system to select test number 08 (developer rotation).

7 Press **Enter** to display:

```
Enter Subset #
08    0
```

Enter the value of the subset # that is appropriate for the developer; select the number from the target toner concentration table below.

8 Press **Enter** to display:

```
Online to Start
AB x YYY
```

When **Online** is pressed, the developer will rotate and updated values of YYY will be displayed. After allowing the rotation/update to run for at least 30 seconds, record the YYY value that is being displayed. While the rotation/update is in progress, the following message displays:

```
Reset to Cancel
AB x YYY
```

Make sure to record the displayed YYY value for the appropriate developer. Press **Reset** to end the rotation/update.

9 Use the following table to convert the number displayed on the control panel to the actual concentration value.

Toner concentration values

Displayed value (YYY)	Actual toner concentration value
Less than 64	Same as displayed value
64 or larger	64 minus the displayed value

10 Using the Internal Humidity reading from the self-test page and the page count for the developer (from NVRAM), locate the target toner concentration value for each developer from the target toner concentration table.

11 If the toner concentration value (derived from step 10) is more than 12 points lower than the target value, then the toner concentration in the developer is too low. If the toner concentration value is more than 12 points higher than the target value, then the toner concentration value is too high. Try the following techniques for correcting low or high toner concentration problems.

Correcting toner concentration levels

Low toner level

Effective resolution of a low toner concentration problem requires correction of the root cause. Here are some likely causes:

- Poor distribution of the toner mix in the developer cartridge at the time of its initial use in the printer.
  - It is possible that shipment or storage of the developer resulted in some toner/carrier segregation. This can result in erroneous calibration of the toner-concentration sensor when the new developer is initialized in the printer. Toner/carrier segregation can result in toner-rich compaction in the concentration-sensor zone. This presents a worst-case condition for sensor calibration error. Properly shaking new developer before initialization, as prescribed in the installation instructions and in the user guide for the printer will usually prevent this condition. Correcting an improper initialization is not practical. If print quality is noticeably deficient, replace the developer.
- Use of a replacement developer that has not been properly initialized in this printer.
  - This can cause a toner concentration error. Short-term use of a previously initialized developer for troubleshooting is acceptable, but the original (properly initialized) developer should be reinstalled after troubleshooting is completed; otherwise, install a new developer.
- Compaction of toner in the replenishment mechanism (auger assembly or feed-in port).
  - This can result in toner depletion.
- Empty auger tubes.
  - If service efforts have resulted in replacing the toner hopper assembly, the toner auger tubes may not have been filled. To correct this problem:

    1 Use Test 19 in Service Mode to unlock the hoppers.

    2 Fill the hoppers with toner, if necessary.

    3 Manually rotate (downwards) the large white gear on the side of each hopper to fill the auger tubes. Do this while holding the auger tube shutter open at the developer end of the auger tube with something in place to catch any toner that escapes, such as a tissue or index card.

- Incomplete toner fill in the auger tubes.
  – Ensure a complete toner fill in the auger tube associated with any developer (which has been revealed by the Toner Concentration Test). This can be accomplished in the manner described above (step 3).
- Incomplete toner concentration test.
  – After completing any corrective action(s) for low toner concentration, such as described above, run the Toner Concentration Test again. Remember, it takes some time for the replenished toner to be uniformly distributed through the developer; the test should be allowed to run for at least 30 seconds before making the front panel reading (ᵗᵀᵀᵀᵀ value). If the resulting ᵗᵀᵀᵀᵀ value is in the range 000 to 100, the printer will return to normal toner concentration on its own during regular operation. If it “errors out” or if the displayed value is greater than 100, manually feed toner (step 3, above) and repeat the Toner Concentration Test. Failure to improve toner concentration values with these measures may indicate failure of the toner concentration detection circuitry or the toner replenishment mechanisms. Installation of a new developer may appear to correct the problem, but if the detection system, replenishment system, or both are malfunctioning, the problem can return.

High toner level

- Recovering from this toner condition is not as easy as recovering from a low toner level. It is important that the root problem for this condition has been clearly identified; otherwise, the problem will be masked for only a short time and the original problem will eventually occur again.

1 Print a solid fill page for the color generating the error. Continue to print this page until the error no longer appears.

2 If far too much toner is in the developer, the developer will need to be replaced.

Target toner concentration

Target toner concentration										
Developer count	Relative humidity									
	20% or less		20-29%		30-39%		40-59%		>60%	
	K	YMC	K	YMC	K	YMC	K	YMC	K	YMC
>0	4	4	3	3	2	2	2	1	2	0
>40	8	8	6	6	4	4	4	2	4	0
>80	12	12	9	9	6	6	6	3	6	0
>120	15	15	11	11	8	8	8	4	8	0
>160	18	18	13	14	9	9	9	5	9	0
>230	21	21	15	16	11	10	11	6	11	0
>310	24	24	17	18	12	12	12	6	12	0
>400	27	27	19	20	14	13	14	7	14	0
>500	30	30	22	23	16	14	16	8	16	0
>650	33	33	24	25	17	16	17	9	17	0
>800	36	36	26	27	19	17	19	9	19	0
>1000	39	39	28	29	20	19	20	10	20	0
>1250	42	42	30	32	22	20	22	11	22	0
>1500	45	45	32	34	23	22	23	12	23	0
>1750	48	48	35	36	25	23	25	12	25	0
>2000	50	50	38	36	26	24	26	11	26	0
>2750	47	47	34	35	24	23	24	10	24	0
>3500	44	44	32	33	23	21	23	9	23	0
>4250	41	41	30	31	21	20	21	8	21	0
>5000	38	38	27	29	20	18	20	6	20	0
>5750	35	35	25	26	18	17	18	4	18	-2
>6500	32	32	23	24	17	15	17	2	17	-4

Target toner concentration (continued)										
Developer count	Relative humidity									
	20% or less		20-29%		30-39%		40-59%		>60%	
	K	Y M C	K	Y M C	K	Y M C	K	Y M C	K	Y M C
>7000	28	28	20	21	16	13	16	0	16	-6
>7500	28	28	20	18	15	12	15	-2	15	-8
>8000	28	28	20	18	15	10	14	-4	14	-10
>8500	28	28	20	18	15	8	13	-6	13	-12
>9000	28	28	20	18	15	8	12	-6	12	-14
>9500	28	28	20	18	15	8	11	-6	11	-16
>10000	28	28	20	18	15	8	10	-6	10	-18
>14000	28	28	20	18	15	8	9	-6	9	-20

54.4 Engine error/service

- A pressure cam home position sensor (PS2) error has occurred. The pressure cam did not sense the home position within 4 seconds after the initial rotation of the pressure cam.
  – Power cycle the printer.

54.4 Cam home position sensor

- The cam sensor (PS2) did not detect home position. This message can also occur with general printer disassembly involving the control PCA or the developer bias supply.
  – Since PS2 is located on the back of the developer bias supply, make sure it is reconnected if the developer bias supply was removed. (See page 139 for the location of PS2.)
  – Make sure that the connector (CN802) on the control PCA is fully seated.

- Other symptoms include the following:
  - complete or partially blank pages
  - smeared vertical line on the front of the page
  - smeared toner image on the back of the page

Note

This message might appear as a result of the drive gears being installed incorrectly causing a loss of cam timing. Follow the cam timing procedure in Chapter 6 of the printer service manual to correct the cam timing problem.

- To troubleshoot the 54.4 message:

1 Open the top cover and locate the tab that activates the AC interlock switch. The tab is located to the right and below the black developer and is part of the developer drive assembly. If the tab is bent, bend the tab until it is aligned with the plunger.

2 If the tab is straight, turn the printer on while checking the 24V DC at the test connector, which is located on the rear of the printer.

Note

The actual measured voltage will be approximately 22V DC.

3 If no voltage is present, check the interlock switches on the left side of the printer and verify that they are working correctly. Replace the switch mechanism if defective.

4 If the switch mechanism is okay and the voltage does not reach 22V when the printer is turned on, replace the DC power supply.

5 If the DC voltage is OK, remove the right-side cover and watch the AC motor (M2) to see if it turns as you turn on the printer.

6 If M2 does not turn, turn off the printer and unplug the power cord. Disconnect the connector to M2 and connect a voltmeter.

WARNING!

With the printer turned on, there is 120/240V AC at this connector. Do not cross the leads of your meter or touch them with your hand. Doing so will cause damage to the printer or result in electrical shock.

7 Plug the power cord into the printer and turn the printer on. Watch to see if the AC voltage is supplied.

8 If power is available replace M2.

9 If no power is available, replace the AC power supply in the Color LaserJet or the DC power supply in the Color LaserJet 5/5M.

10 If the power supply does not solve the problem, follow the procedures for the cam service Mode test to verify that the sensor is operating correctly.

11 Run test 53 in service Mode to verify that the solenoid is operating. You should be able to hear when the solenoid turns on or off. Replace the solenoid if defective. A good solenoid should have a resistance value of approximately 56 ohms.

12 If the solenoid is okay when the resistance is measured and everything else noted above has been checked, replace the control PCA.

Cam Service Mode test

1 Enter the status and test section of the Service Mode (see “Accessing Service Mode” in Chapter 3).

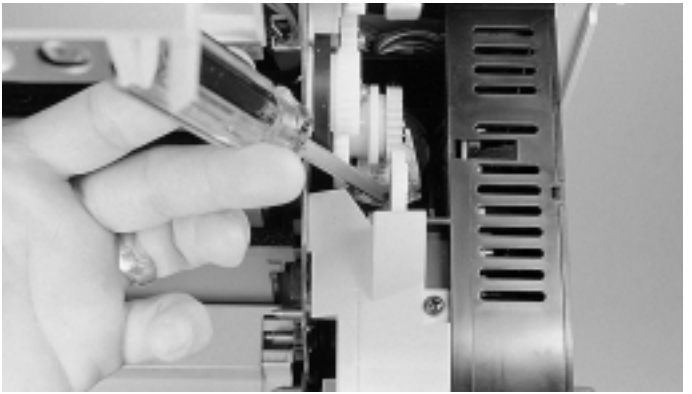
2 Select address 51.

3 Open the top cover, remove the print drum, and release the cam solenoid (SL4), as shown in the figure below.

4 Turn the gear train slowly, and watch the control panel display. The status display will change from 000 to 001 when the cam home sensor is activated.

If the home sensor reading does not change, check the following:

- The developer bias supply is fully seated.
- The cam home sensor is mounted in the printer frame correctly.
- The sensor connector is in good repair.
- If all of the above are okay, replace the sensor PS2. (See page 141 for the location of PS2.)
- When checking the cam home solenoid, run a demo page. With the top cover removed, check that the solenoid releases. If it does not, replace solenoid (SL4) and its clutch, and then check the cam timing as shown in Chapter 6 of the printer service manual.



Releasing the pressure cam home solenoid

54.5 Engine error/service

- A developer home position sensor (PS6) error has occurred. The developing switch position sensor did not detect the home position within 4 seconds after the initial motion of the pressure cam.

54.5 Developer home position sensor

- The printer failed to detect the developer cam home position within 4 seconds after the initial rotation of the pressure cam.
- The sensor (PS6) is defective. (See page 141 for the location of PS6.)

Note

If this message occurs after general printer disassembly around the control PCA, the sensor PS6 may be disconnected. See chapter 5 under “Sensors” in the printer service manual to locate PS6, and check that it is plugged in both at the sensor and at the control PCA (CN802).

54.5 Service Mode test

1 Select the Service Mode Status and test address 51 and check that the developer drive motor rotates.

2 If the developer drive motor (M2) does not rotate, check the connectors. If the connectors are proper and M2 still does not rotate, replace M2.

3 If the developer drive motor rotates, use the status Mode test (50) to test the developer home sensor. (It may be necessary to turn the gear train by hand to activate this sensor.) The display changes from 00 to 01 when the sensor is activated.

4 If the sensor does not activate, check that the sensor is properly connected at both ends.

5 If the connections are correct and the sensor is properly mounted, replace the sensor, PS6.

55.X Engine CMD error

- All 55.X messages indicate that the formatter and the control PCA have failed in some aspect of their communication. When troubleshooting this message:
  - Reseat the formatter into its connector and perform a test print.
  - If the message persists, remove the formatter, and check that none of the formatter connector pins are bent or broken. (This is not a probable cause if the control PCA or formatter have never been removed.)
  - Check the 5V fuse on the control PCA. If the fuse is blown, attempt to determine why the fuse blew, then correct the condition.
  - If the message persists, replace the formatter, followed by the control PCA if necessary.

56 Laser index service

- The printer failed to register the beam detect pulse, or the beam detect pulse is missing.

1 Power cycle the printer to clear this error.

2 Check the wiring harness behind the power supply drawer for nicks and cuts.

3 Wrap with insulation tape to prevent the wires from grounding.

4 If the error persists, replace the laser scanner assembly, followed by the control PCA if necessary.

5 Reseat all the connectors to the laser scanner assembly.

- The laser index pulse is absent.
  - Open and then close the side door and power cycle the printer.

57 Fan motor service error

- There is a cooling fan error.
  - One of the cooling fans is not connected.
  - One of the cooling fans is defective.
- Either the main body fan, formatter cooling fan, DC power supply fan, or fuser cooling fan is not running or is running at an incorrect speed.
  - Power cycle the printer to clear this error. If the error persists:
    - Reseat all fan connectors on the relay board.
    - Ensure that the wiring harness is in good condition, and that the wires are fully seated into the connector.
    - Check that nothing inhibits the fan rotation.
    - Replace the defective fan assembly.

Note

The formatter cooling fan and DC power supply fan are only for the Color LaserJet.

59 Manual feed service error

- The RFU was removed or installed while the power was on.
  – Power cycle the printer to clear this error.

59 Alternate feed service

- The RFU was installed or removed while the printer was turned on.
  – Power cycle the printer to clear this error.

CAUTION

Installing or removing the rear feed unit with the printer turned on may damage the electronics within the unit.

- If the message persists after power cycling, replace the RFU.
- Check the blade connectors on the RFU and inspect their matching connectors on the printer. Check that the pins are straight and that none of the connectors are damaged. If the printer has been disassembled, ensure that none of the wires are damaged (pinched).

60.X SIMM error/SIMM service error

Note

The 60.X through 63.X Service errors occur only during the power-on sequence.

- The firmware detects a bad CRC (cyclical redundancy check) in a SIMM. (The bad SIMM is indicated by the X.) The printer completes its power-on sequence without initializing (and therefore using) the defective SIMM, but uses all base RAM and usable SIMMs. The 60.X message appears in the display when the power-on sequence is complete. Full memory capability is not available.
- Multiple ROMs (such as two PostScript ROMs or two Epson ROMs) have been installed. Troubleshoot this message as follows:

  1 Power cycle the printer to clear this error.

  2 If the error persists, reseat the indicated SIMM and try to print.

  3 Replace the indicated SIMM.

– If the SIMM is detected when the printer is turned on, the bad SIMM can be ignored.

4 Replace the formatter.

61.X SIMM compatibility

- The size or speed of the SIMM that is installed is incompatible with the formatter. If this SIMM is detected when the printer is turned on, the printer does not use the incompatible SIMM, but uses all base RAM as well as usable SIMMs. The 61.X message appears in the display when the power-on sequence is complete. Full memory capability is not available. Troubleshoot this message as follows:

  1 Power cycle the printer to clear this error.

  2 If the message persists, reseat the indicated SIMM and try to print.

  3 Finally, if the message persists, replace the indicated SIMM with a compatible SIMM.

62.x Internal ROM service

- A checksum error has occurred in the ROM. The X indicates which ROM generated the error. If x=0, the error is in the code ROMs. If x=1, the error is in the lower 4M ROMs. If x=2, the error is in the upper 4M ROMs. Power cycle the printer to clear this error. If the error persists, replace the formatter. The individual ROMs are not replaceable.

Note

Indicate the failure Mode on the return slip when exchanging the formatter PCA.

62 Internal ROM service error

- This message indicates an error in the internal ROM.
  – Power cycle the printer to clear this error.
- If the error persists, replace the formatter.

63.0 DRAM service error

- This message indicates the printer detected an error in the base DRAM.
  - Power cycle the printer to clear this error.
  - If the error persists, replace the formatter PCA.
- When this error message is displayed, pressing any control panel key displays more information about this error

Note

Indicate the failure Mode on the return slip when exchanging the formatter PCA.

63.X SIMM error

- This message indicates a faulty SIMM expansion memory module.
- If the error occurs when the printer is turned on, press **Continue**.
- If this error occurs after the printer is turned on, unplug the printer and remove the defective SIMMs as indicated by the control panel display.

Note

When a SIMM expansion card is removed, the printer can continue to operate, but may not be able to print all jobs that require greater memory. The printer still uses the base memory plus all the installed SIMMs.

64.X DMA timeout service error

- The printer has detected a video direct access error. Power cycle the printer to clear this error. If the error persists:

  1 Run the job that caused the error, then wait about 3 minutes for the timeout to repeat.

  2 If the error message reappears, run a self-test, and wait another three minutes. If the message persists, reseat, then replace the formatter PCA, followed by the control PCA, if necessary.

  3 If no error appeared after running the job, run the error log to see the occurrence rate.

4 If the error occurs frequently:

- Reseat, then replace the formatter.
- Check the 5V DC line for noise.
- Check the 5V DC voltage at the control PCA.
- Replace the control PCA, if necessary.

- The printer detected a video DMA error.
  - Power cycle the printer to clear the error.
- If the error persists, run the extended diagnostic test to determine the cause. See “Extended diagnostics” on page 110.

66.1 Jam sensor service error

Drum reflectance calibration procedure

- The printer must initially and periodically calibrate the electronics against the value of print drum reflectance. The sensor on the jam detect PCA senses media wrapping on the drum and the value of print drum reflectance. The print drum reflectance changes over time. False jams may occur if the print drum reflectance is not recalibrated. This message occurs when the printer calibrates the print drum reflectance during new drum installation, or during the course of normal, periodic print drum recalibration. To troubleshoot this error:

1 Power cycle the printer and enter the Service Mode (See Chapter 3).

2 Enter test code 47 and press **Enter**. The printer will begin the drum calibration process.

3 If the message persists after performing the drum reflectance calibration, the drum reflectance is out of specification. This may be caused by a faulty yellow developer. Ensure that a solid yellow strip is being deposited on the drum during the calibration process.To do so, interrupt the calibration process by opening the cover while the printer is turned on to inspect the yellow calibration strip on the drum.

4 Clean the drum-wrap sensor as described below.

5 Replace the print drum.

- An abnormal drum-wrap value was detected while the sensor was being calibrated.
  - Clear this error by reinstalling the drum, or power-cycling the printer.

Cleaning the drum wrap sensor

- The drum-wrap sensor may be cleaned if necessary. Perform this task only if the printer has become dirty from a neglect of periodic maintenance.

CAUTION

Be careful not to damage the print drum. To prevent scratching, place the print drum on the cleaning cloth provided in the collection kit. Also, do not blow on the print drum.

1. Remove the print drum from the printer and place it on the cleaning cloth provided in the collection kit.
2. Place a sheet of paper between the print drum and the sensor.
3. Remove the screw located at the top of the print drum.
4. Remove the print drum neutralizing corona housing.
5. Release the sensor board from its retainers, being careful not to damage the print drum.
6. Ensure that connectors CN970 and CN971 are fully seated.
7. Use the toner cloth provided in the toner collection box kit to clean the sensor.

Note

Run the reflectance calibration service Mode status and test (address 47) procedure after cleaning the drum-wrap sensor.

68 NVRAM error

- A recoverable error has been detected in the formatter NVRAM.
  - Press **Online** to clear the error, then verify the control panel settings. One or more of the control panel settings may have been reset to the factory defaults during error recovery.
- Run the extended diagnostics test before replacing any components. See “Extended diagnostics” on page 110.
- Replace the formatter if the error occurs whenever the printer is turned on.

68 NVRAM service error

- A general formatter NVRAM failure has occurred.
  - Power cycle the printer to clear the error.
- If the error persists, run the extended diagnostic tests to determine the cause. See “Extended diagnostics” on page 110.
- This message refers to the formatter NVRAM, not the NVRAM chip on the DC controller board.

68 Cold reset

- All of the control panel values have been reset to their factory defaults. If this message appears whenever the printer is turned on, part of the formatter NVRAM is defective.
  - Check that the **Online** key is not stuck. If the **Online** key is okay, replace the formatter.
  - Run the extended diagnostics tests before replacing any components. See “Extended diagnostics” on page 110.
  - If the message persists, replace the formatter.

79 Service error

- If this error is associated with a specific job, there could be a defect in the software code that created the job.
  - Run a self-test to check that the error is not generated by the printer. If the error is isolated to the user's print job, refer the user to the software manufacturer.
- An unrecoverable error occurred in the formatter PCA firmware.
  - Run the extended diagnostic tests to get more information about this message. Then, power cycle the printer to clear this error.
- Replace the formatter if the error persists.
  - Be sure to include the failure code which accompanied the message on the control panel when returning the formatter.

Note

It is extremely rare that a formatter causes a 79 Service error.

80 Service

- This error indicates that an unrecoverable MIO error has occurred. The XXX meaning is listed in the technical reference manual that came with the MIO card.
  - Power cycle the printer to clear this error.
  - If the error persists, replace the MIO card.

Note

Run the extended diagnostic tests before replacing any components. See "Extended diagnostics" on page 110. Be sure to put the entire error code (including the numbers in parentheses) on the return slip when returning the MIO card. Also, be sure to include the failure code which accompanied the message on the control panel when returning the MIO card.

89 Service

- An unrecoverable error occurred in the PostScript SIMM.
  - Power cycle the printer to clear this error.
- Run the extended diagnostic tests before replacing any components. See “Extended diagnostics” on page 110.
- If the message persists, replace the PostScript SIMM.
  - Be sure to include the failure code which accompanied the message on the control panel when returning the PostScript SIMM.

Aids to troubleshooting

Troubleshooting by swapping parts

The printer records the age of most of the user-replaceable maintenance units. All new maintenance units (except the toner collection kit) have fusible links. When a new maintenance unit is installed, the printer senses its fusible link and blows the fuse. The control PCA resets the counter for the maintenance unit to zero. When the developers or print drum are replaced, the control PCA restarts the page-dependent firmware algorithms which control the printer operating point. Also, when the print drum is replaced, the drum-winding sensor is calibrated.

The fusible links and the associated firmware algorithms affect service and troubleshooting strategy as follows:

- The maintenance units cannot be removed and used as a new unit in another printer.
- If a new maintenance unit is installed, the control PCA resets its counters and determines the optimum operating point for the installed unit. If another unit with no fusible link (such as a print drum or developer from another printer) is installed, the operating point will not be correct. The correct operating point is especially critical for the print drum and developers.

Swapping parts

The following procedures use maintenance units known to be in good working condition to help troubleshoot maintenance units problems. Ensure that the original (or a new) maintenance unit is installed after performing each procedure. Do not leave a test unit installed.

Print drum

A test print drum, which has the fusible link already blown, can be installed to verify failures such as repetitive print defects. Do not print more than 50 pages with the test drum. The test print drum may cause `13.1 CLEAR DRUM WINDING JAM` errors. If this occurs, use the Service Mode status and test address 47 to calibrate the drum-winding sensor. It is necessary to recalibrate this sensor when installing the original drum. If the print defect is confirmed and a new print drum is installed, the drum-winding calibration process is automatically performed as part of the installation algorithm. Do not leave the test print drum installed after troubleshooting.

Developer

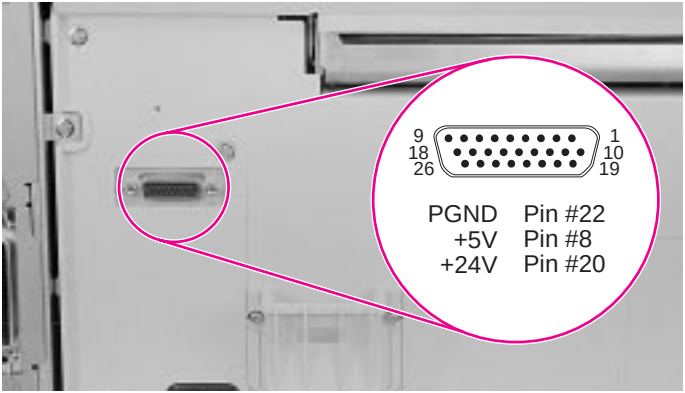
A test developer in which the fusible link has already blown can be used to troubleshoot print problems such as white lines. Do not print more than 50 pages with the test developer. If the print defect is shown to be unrelated to the developer, be sure to reinstall the original developer. If the defect is related to the original developer, use the installation procedures shown in Chapter 4 of the service manual to install the new developer. Do not leave the test developer installed after troubleshooting.

Transfer belt, fuser, and coating kit

Test units in which the fusible link has already blown can be installed briefly to verify print defects. Do not print more than 200 pages with these units. If a print defect is not verified, reinstall the original unit. If a defect is verified, replace the defective unit as described in Chapter 4 of the service manual. Do not leave the test components installed after troubleshooting.

Voltage checks

The illustration below shows the most readily accessible voltage test points of the printer.



Voltage test points

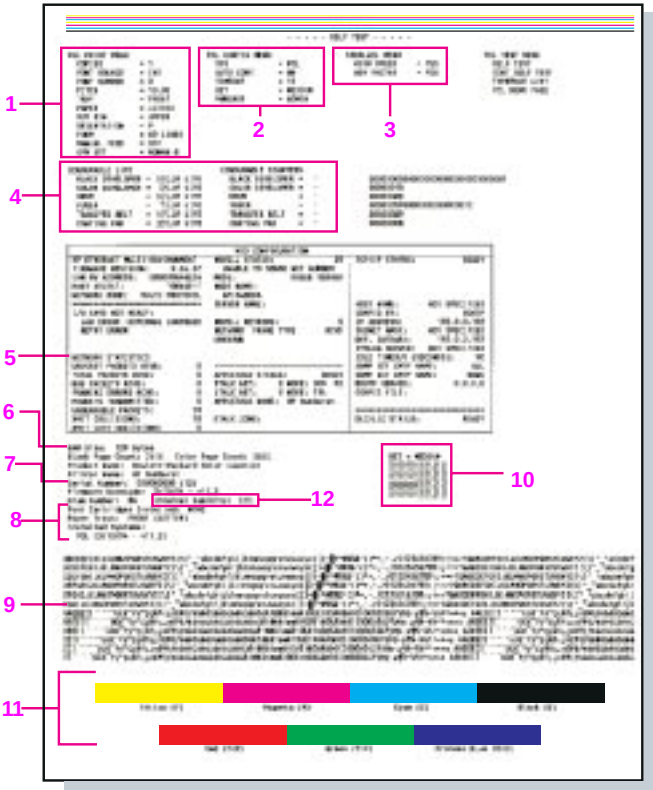
CAUTION

Be careful not to damage the printer when inserting test probes in the connector.

Note

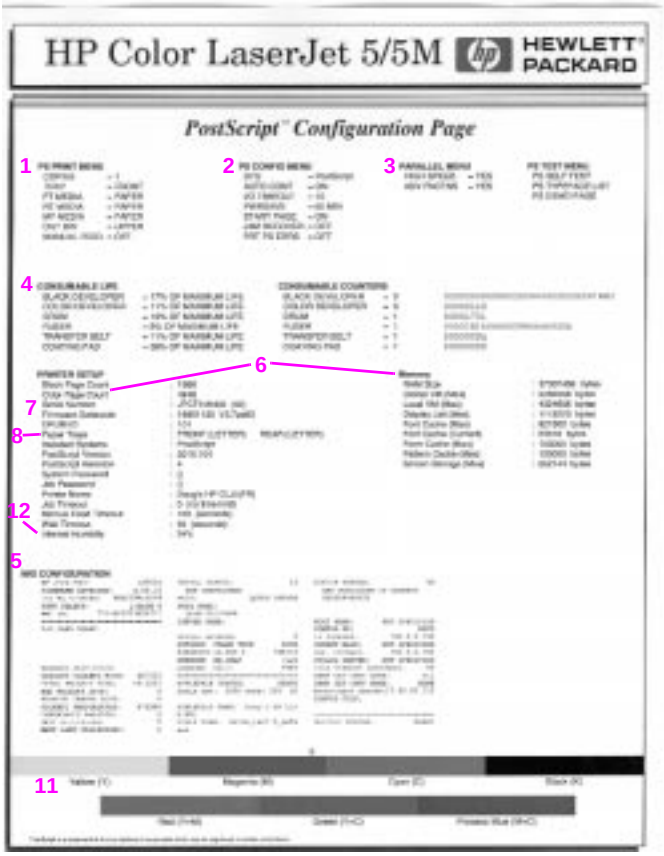
The actual voltage measured for 24V will be approximately 22V.

Understanding the self-test printout



PCL self-test page (Color LaserJet)

(See the table on page 67 for a description of the numbered elements.)



PostScript self-test page (Color LaserJet 5/5M)

(See the table on page 67 for a description of the numbered elements.)

PCL self-test page (Color LaserJet 5/5M)

(See the table on page 67 for a description of the numbered elements.)

Self-test page elements

1	**Printing menu:** Shows the configuration of the print menu.
2	**Config menu:** Lists the current printer configuration.
3	**Parallel menu:** Lists the configuration for the parallel I/O port. This is not the same as the MIO configuration. The advanced functions feature enables the bidirectional I/O.
4	**Consumable life:** Lists the percent of the maximum life used by each of the printer maintenance units. use this section when performing printer maintenance, and when deciding how to troubleshoot specific printer failures. The consumable counters show how many of each maintenance units have been installed in the printer throughout its life.
5	**MIO configuration:** Shows the configuration of the MIO.
6	**Installed memory and page count:** Displays the memory recognized by the printer, and the page count. Black pages and color pages are listed separately. Add the numbers to get the total page count.
7	**Serial number and firmware datecode:** The serial number is used when replacing the formatter PCA. If possible, run the self-test page before replacing the formatter. The firmware datecode is used by HP to identify the printer's program level.
8	**Options:** Shows the installed and recognized optional printer components.
9	**Print test pattern:** (displayed on PCL self-test page only) Tests the print drum for random defects.
10	**REt setting:** (displayed on Color LaserJet self-test page only) Shows the current REt setting. Use the lines to adjust the REt setting such that the horizontal and vertical lines match. Inaccurate REt settings cause horizontal and vertical bands in the lines.
11	**Color bars:** Demonstrates that each of the primary and process colors are enabled.
12	**Internal humidity:** Shows the humidity inside of the printer as read by the internal humidly sensor.

Troubleshooting paper feed problems

Paper problems

Paper problems can be difficult to detect. The following series of steps will help isolate paper-induced problems versus printer problems:

- Isolate a paper path.
- Isolate a brand of paper.
- Isolate a type of paper.
- Evaluate paper-use practices.
- Evaluate environmental conditions.

Here are some simple tips:

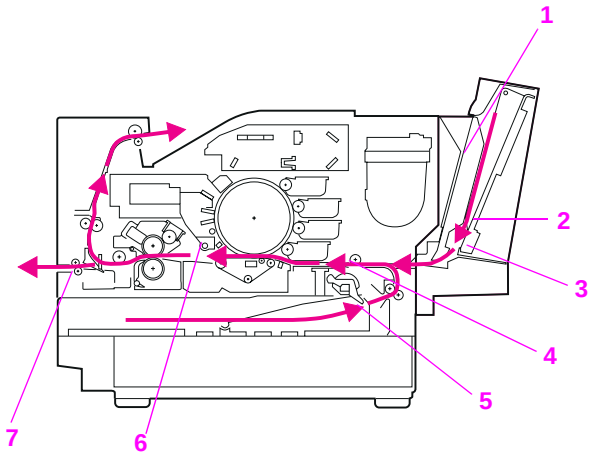
- Turn the paper over and print on the other side. Doing so often corrects excess paper curl.
- Rotate the paper 180° (end-to-end) to feed a different leading edge. This can help correct multi-sheet feeding problems.

Paper jams

When troubleshooting paper jams, remember that jams are posted as a result of timing errors. That is, paper fails to arrive at (or fails to clear) the paper path sensor in the allotted time. The paper path timing is set by the control PCA. Stuck or defective sensors will cause the paper path timing to post a jam message when the printer is turned on, as will scraps of paper caught in the paper path. See the figure on page 69 to locate the paper path sensors. The paper jam message code identifies the sensor which failed to change state within the required time.

Note

Check that the paper path sensors are free throughout their full range of travel. All interlock switches must be operational in order for the printer to clear paper jam messages.



Paper path sensors

1	Manual feed sensor (RFU)	5	PS8 paper out sensor (main tray)
2	Paper-out sensor (RFU autofeed)	6	Drum wrap sensor board
3	RFU paper in path sensor	7	PS1 paper exit sensor
4	PS7 paper registration sensor		

- Check that the transfer corona cleaner is pushed all the way to the right. Paper jams occur when this knob is out of place.
- Clean the printer. Toner and paper dust in the paper path inhibit free movement of media through the printer and block the sensors.
- Vary the input and output selections of the printer to determine if the problem is associated with a particular area of the printer.
- Worn separation pads on the paper tray cause last page multifeeds. Check the condition of the pickup rollers and separation pads when troubleshooting multifeeds. Bent separation tabs cause misfeeds and multifeeds. Replace the tray if necessary.

- Defective paper tray switches may cause paper jams by indicating the wrong size paper to the formatter.
- Scraps of paper left in the paper path may cause intermittent paper jams. Always check that the paper path is clear when cleaning the printer and when clearing paper jams. Also, remove the fuser and carefully check it for jammed paper.
- If the optional RFU is installed, check that the paper is loaded correctly. Check that the correct paper size is selected and that the paper is not slumped.
- Curl on the trailing edge of transparencies is caused by improper face-up output bin position. Make sure the face-up output bin is pulled out all the way. It tilts up slightly when in its proper position.

Reduce curl of black-only transparencies by printing to the face-up output bin and by keeping the transparencies in a presentation sleeve.

CAUTION

Duplexing (printing on both sides of the page) is not supported and could damage the printer. Duplexing causes paper jams at the input and exit areas.

Multifeeds from the front input tray

- Check that the media meets the specifications for this printer. Rough paper and lightweight media multi-feed more frequently.
- Ensure that the media is not sticking together in the paper stack.
- Check the condition of the media. Look for damaged paper or ragged edges.
- Check the paper stack tabs in the paper tray (see Figure 7-17 on page 7-68 in the service manual). Replace the paper tray if the tabs are bent or burred.
- Check the paper-size adjustment lever to ensure it is snug against the media without pinching.
- Check that the media is fully under the paper stack tabs. Do not overload the paper tray. The paper tray can hold approximately 250 sheets of 20-pound paper (a 1-inch stack).

Feed problems from the rear feed unit (RFU)

- Check that the media meets the specifications for this printer.
- Check that the RFU is not overloaded. The RFU can hold 250 sheets of 20-pound paper (a 1-inch stack).
- Check the paper-size adjustment for the rear input tray and the manual feed input.
  - The guides should be snug against the media without pinching.
  - The paper adjustment knob for the rear input tray should be set for the correct media before the media is loaded. If necessary, fine adjustments can be made after the media is in the tray.
- Check that media is not slumped forward in the rear input tray. The top cover or the rear tray must be fully opened when loading media.
- Check that the media is neatly stacked in the rear input tray.
- When manually feeding, push the media slightly into the pickup roller nip, especially when using legal and tabloid size paper.
- The pickup rollers should be cleaned with a cloth moistened with isopropyl alcohol.

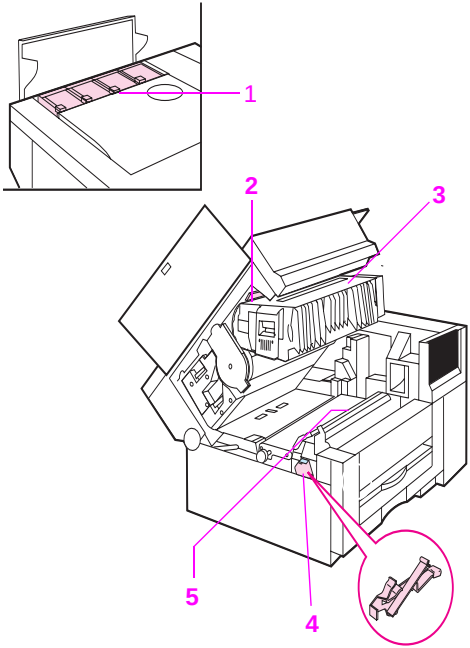
2 Cleaning and maintenance

Overview

This chapter gives information on cleaning and maintaining the printer, and on identifying consumables.

Cleaning locations and tool

The following illustration shows the areas of the printer that require periodic cleaning and the location of the provided laser optics cleaning tool.



Areas that require periodic cleaning

1 Toner hopper area

2 Laser optics glass

3 Drum corona wire *

4 Laser optics cleaning tool

5 Transfer corona wire

* New style drum (C3967A) only.

Regular maintenance procedures

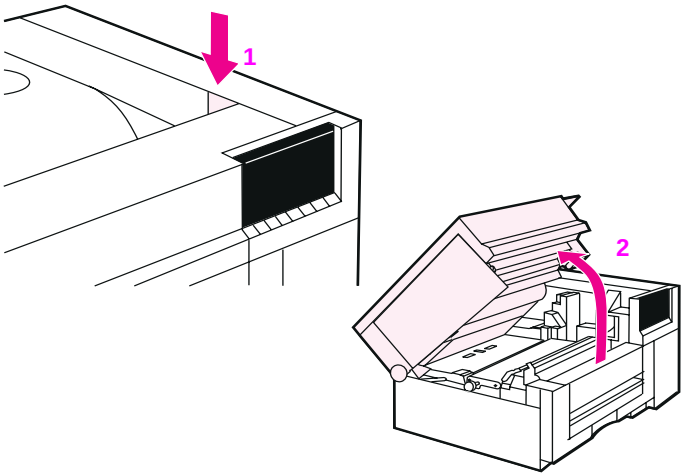
Overall print quality largely depends on keeping critical components of the printer clean. Some of the more sensitive printer components need to be cleaned regularly (approximately every 2,000 pages) to ensure the highest possible print quality. Use the procedure that follows to clean these three components:

- optics glass
- drum corona
- transfer corona

CAUTION

Remove all jewelry and watches before continuing. The drum can be easily scratched, causing damage.

Do not expose the print drum to direct light for extended periods. Exposure to light can permanently damage the drum.

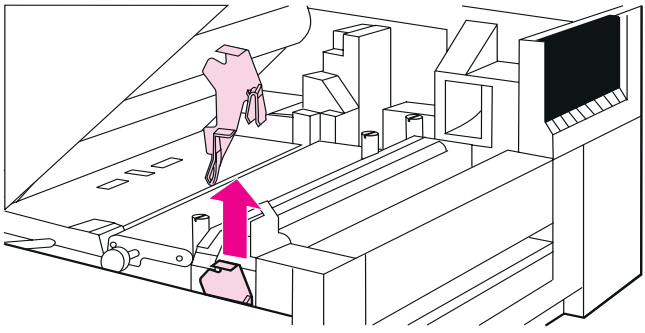


1 Press the top cover release button (1) and open the top cover (2).

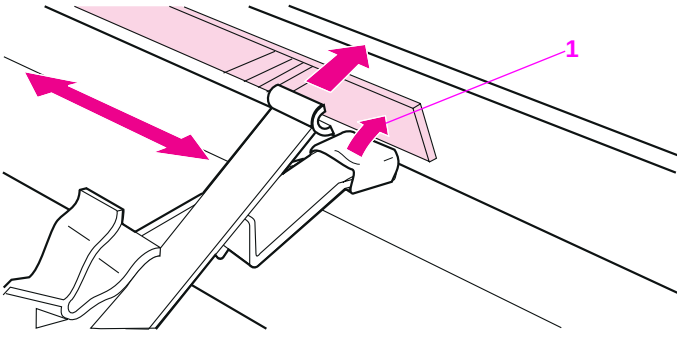
2 Pull the drum lock lever at the left edge of the drum toward you. Lower the drum until it is horizontal.

CAUTION

Be careful not to contaminate the cleaning tool pad with the oil from your hands or other contaminants.

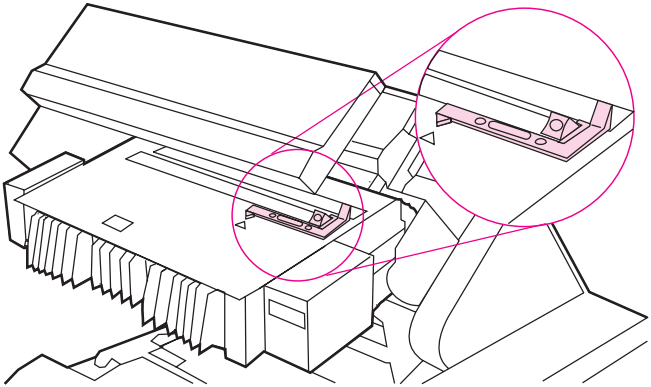


3 Locate the laser optics cleaning tool.

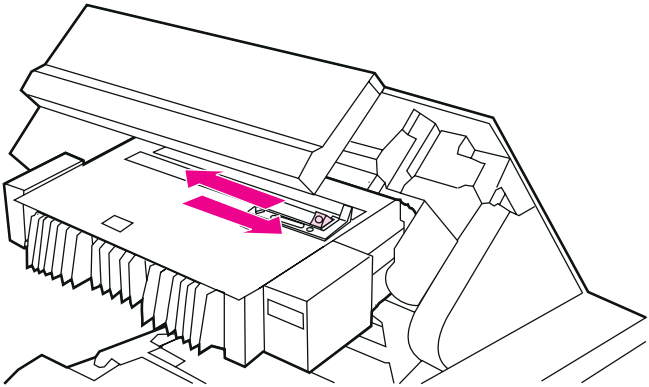


4 Insert the cleaning tool above the drum with the padded portion down and towards the glass, and with the cupped portion against the chrome rod (1). Press the pad on the cleaning tool firmly against

the right end of the optics glass. Slide the cleaning tool to the left side of the printer, and then slide it back to the right. Repeat several times, then return the cleaning tool to its storage place.



5 Find the drum cleaning handle located toward the back-right corner of the main drum.



6 Slide the cleaning handle slowly and smoothly to the left end of the drum and completely back to the right home position. (This

procedure should take approximately 3-5 seconds.) Repeat as necessary.

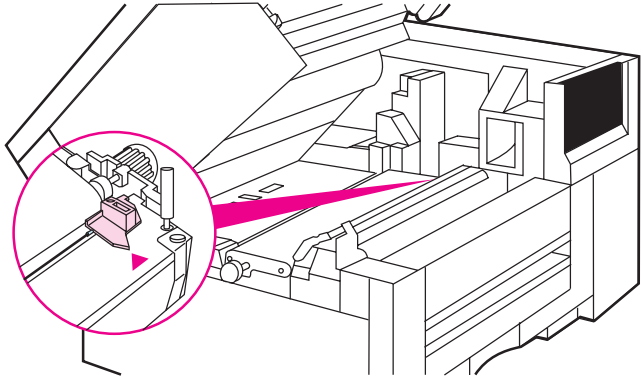
7 Raise the drum until it locks into place.

Note

The drum corona cleaning handle is only on the new style drum (C3967A).

CAUTION

Before closing the printer, be sure that the drum corona cleaning handle and transfer corona cleaning knob are reseated in the full-right position.

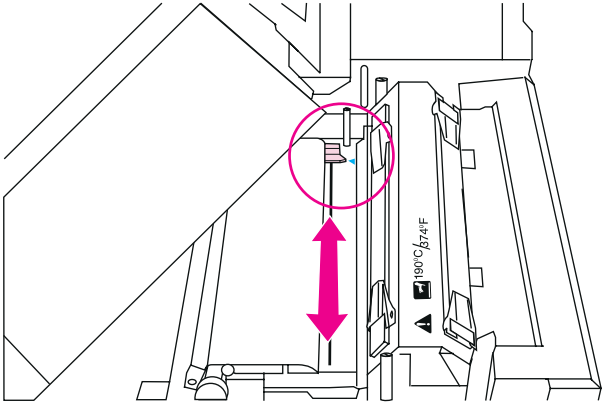


8 Locate the transfer corona cleaning knob located between the transfer belt and the fuser on the right side of the printer.

CAUTION

Do not touch the transfer belt surface. Oil from your hands and debris can reduce the life span of the belt and affect print quality.

9 Slide the cleaning knob slowly and smoothly to the left end of the drum and completely back to the right home position. (This procedure should take approximately 3-5 seconds.) Repeat as necessary.



10 When you add toner, clean the toner reservoir area. Add toner only when prompted by a control panel message.

- Push the optional rear feed unit away from the printer. Then open the toner reservoir cover and use the cover to hold the rear feed unit away from the printer.
- With the cleaning cloth from the toner collection kit, wipe off any dust or toner on the area between the individual toner doors.

CAUTION

Do not drop excess toner into the manual feed area. Toner in the manual feed area can result in manual feed problems.

- Close the toner reservoir cover.
- Return the optional rear feed unit to its upright position against the back of the printer.

Replacement of maintenance units

The printer prompts you from the control panel when it is time to replace a maintenance unit. The following table lists the approximate time intervals for replacing maintenance units. For proper printer operation, use only HP maintenance units. (See Chapter 8 in the service manual.)

Approximate replacement intervals

Unit	Printer message	Page count**	Time period*
Toner	TONER OUT [CMYK] ADD [color]	2200 pages	1 to 2 months
Toner collection box filter	14.5 REPLACE COLLECTION KIT	Varies with toner usage.	4 to 6 months
Coating pad, cleaning roller	14.6 REPLACE (CLJ)*** COATING PAD KIT	Varies with toner usage.	4 to 6 months
Coating roller, cleaning roller	14.6 Replace Coating Kit (CLJ5/5M)****	Varies with transparency usage	4 to 6 months
Black developer	19.1 BLACK DEVEL. USER MAINTENANCE	40,000 pages	15 months
Color developer	19.2 COLOR DEVEL. USER MAINTENANCE	40,000 pages	15 months
Transfer belt	19.5 TRANS BELT USER MAINTENANCE	60,000 pages	30 months
Fuser	19.4 FUSER USER MAINTENANCE	80,000 pages	40 months
Print drum	19.3 DRUM USER MAINTENANCE	60,000 pages*****	30 months

* This time period assumes you are printing 2,000 pages per month. If your print quantities differ, adjust the time period accordingly.

** Approximate page count based on 5% coverage of individual toner colors

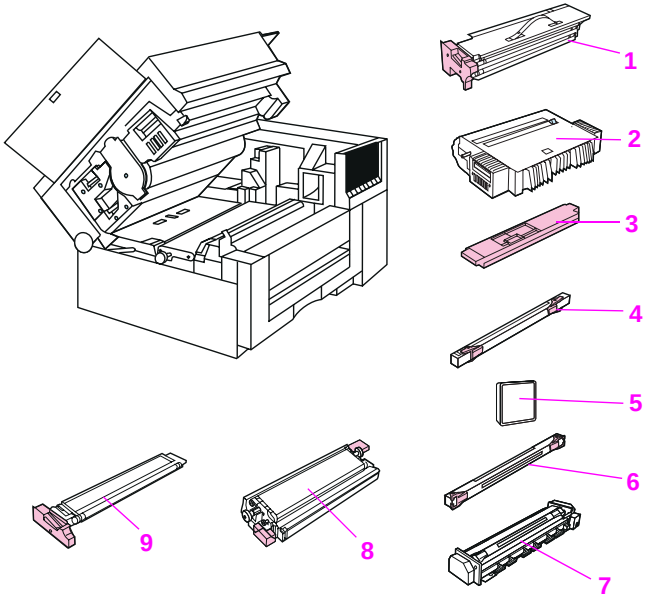
*** HP Color LaserJet printer

**** HP Color LaserJet 5/5M printer

***** The page count for the drum increments once for every standard black and white or monochrome page and twice for each multiple color page, legal, tabloid, or A3-size page.

Identifying consumables

The following illustration shows the location of the consumables.



Consumable locations (CLJ 5/5M)

1	Color developer	**4**	Coating roller**	**7**	Fuser
2	Print drum	**5**	Ozone filter**	**8**	Transfer belt
3	Toner collection box *	**6**	Cleaning roller	**9**	Black developer

* The toner collection box and ozone filter are included in the collection kit.

** The cleaning roller and coating roller are included in the coating kit.

Note

Do not install an old-style coating pad kit into a new style fuser. See the “Supplies compatibility” table on page 83.

Note

All original maintenance items for the HP Color LaserJet printer have blue handles and tabs that indicate user access or lift points. With the exception of the toner area, the maintenance items in the HP Color LaserJet 5/5M printer should have purple handles and tabs.

Supplies compatibility

The following supplies for the HP Color LaserJet 5/5M printers are fully backward-compatible with the HP Color LaserJet printer. However, the original set of HP Color LaserJet printer supplies should not be used in HP Color LaserJet 5/5M printers.

HP Color LaserJet and HP Color LaserJet 5/5M

Product number	Product name	Comment	Compatible with	
			HP Color LaserJet	HP Color LaserJet 5/5M
Toner Supplies				
C3105A	Black toner bottle	full compatibility	•	•
C3102A	Cyan toner bottle	full compatibility	•	•
C3103A	Yellow toner bottle	full compatibility	•	•
C3104A	Magenta toner bottle	full compatibility	•	•
C3120A	Toner collection kit	full compatibility	•	•
C3106A	Coating pad kit	compatible with C3911A fuser unit only	•	
C3964A	Coating kit*	compatible with C3969A fuser unit only	•	•
Imaging Units				
C3107A	Black developer	HP Color LaserJet compatibility ONLY	•	
C3965A	Black developer*	full compatibility	•	•
C3108A	Color developer	HP Color LaserJet compatibility ONLY	•	
C3966A	Color developer*	full compatibility	•	•
C3109A	Print drum	HP Color LaserJet compatibility ONLY	•	
C3967A	Print drum	full compatibility	•	•
C3110A	Transfer assembly	HP Color LaserJet compatibility ONLY	•	
C3968A	Transfer assembly*	full compatibility	•	•
C31111 Opt. 110 or 220A	Fuser 110 = 110V Opt. 220 = 220V)	HP Color LaserJet compatibility ONLY	•	
C3969A Opt 110 or 220	**Fuser*** (Opt 110 = 110V Opt 220 = 220V)	full compatibility	•	•

* Products in **bold-faced type** are new supplies introduced with the HP Color LaserJet 5/5M printers.

3 Service Mode and diagnostics

Overview

Service Mode allows service personnel to verify and manipulate internal printer settings and diagnostics. Service Mode should be used only by authorized service personnel.

Service Mode menu

Service Mode is used to test printer functions by issuing commands to the control board through the control panel. The menu items are:

- **Register adjust** allows the service engineer to change the factory-set NVRAM values that control the placement of the image on the page. In this mode, detailed developer counter information is also available for troubleshooting toner concentration problems. Enter this mode as shown in the “Keystroke sequence to enter Service Mode” on page 87 and “Keystroke sequence to enter Register Adjust Mode” on page 90. See the “Register adjust addresses” table on page 91.
- **Status requests** indicates the state of an *input* to the control board. Generally, this test applies to sensor requests and switches. These commands have a control panel indication (or digital value, either high or low) of the state of the selected input. Inputs that can be checked with the Service Mode are listed in the “Status and test address” table on page 94.
- **Operation commands** control the output of the control board to the selected component. (Motors and developers are examples of selectable components.) The command addresses are listed in the “Status and test address” on page 94. Issuing an output command starts the function shown in the output list.

Note

Some outputs will stop automatically after a preset time.

- **Subtests** of the operation command are used for components with multiple assemblies, functions, or modes. These subtests are identified by a subtest number. Subtest numbers allow the operator to select a particular item when several selections are possible. The subtest numbers are listed in the table on page 97.

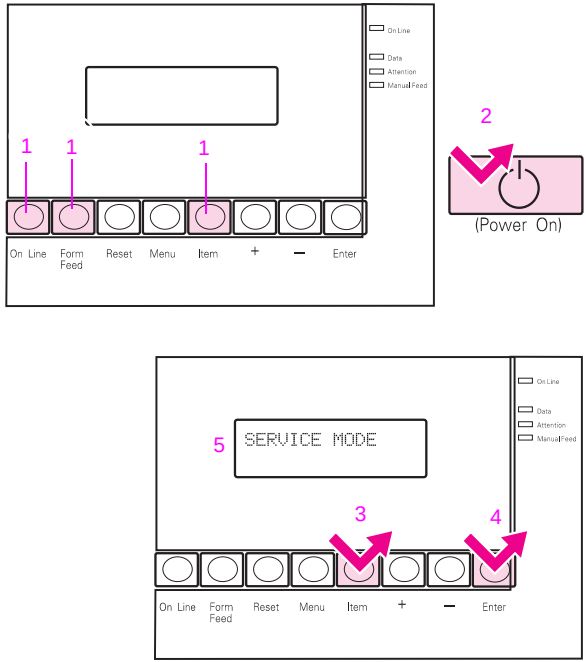
Accessing Service Mode

1 Turn off the printer.

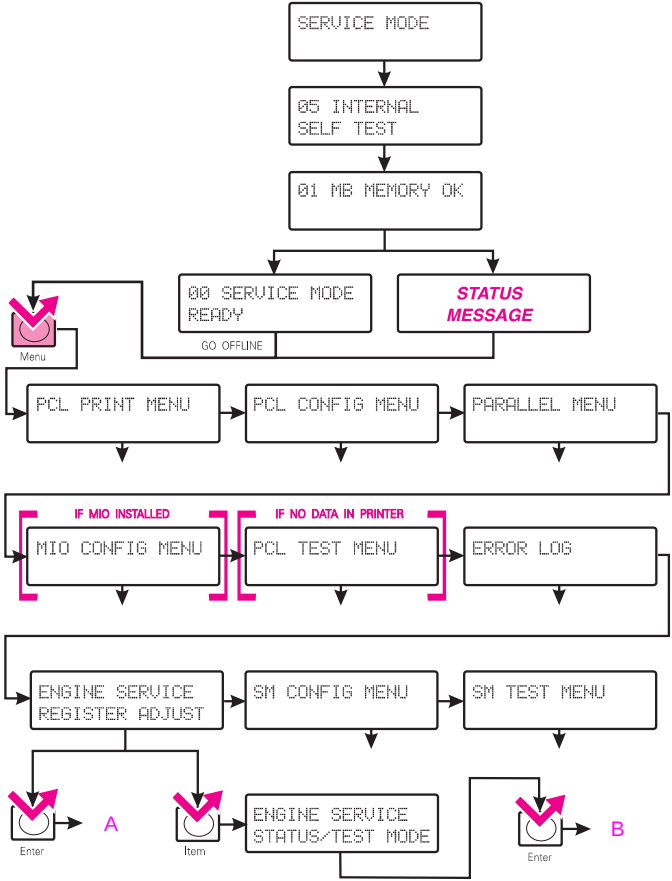
2 Press and hold **Online**, **Form Feed**, and **Item** (simultaneously) while turning the printer on. Continue holding the keys until all the control panel lights are illuminated and the control panel display is blank.

3 Press **Item**, and then press **Enter**.

The display will flash SERVICE MODE. Allow the printer to complete its self-test and boot cycle.



Keystroke sequence to enter Service Mode



Service Mode flow chart

Register Adjust Mode

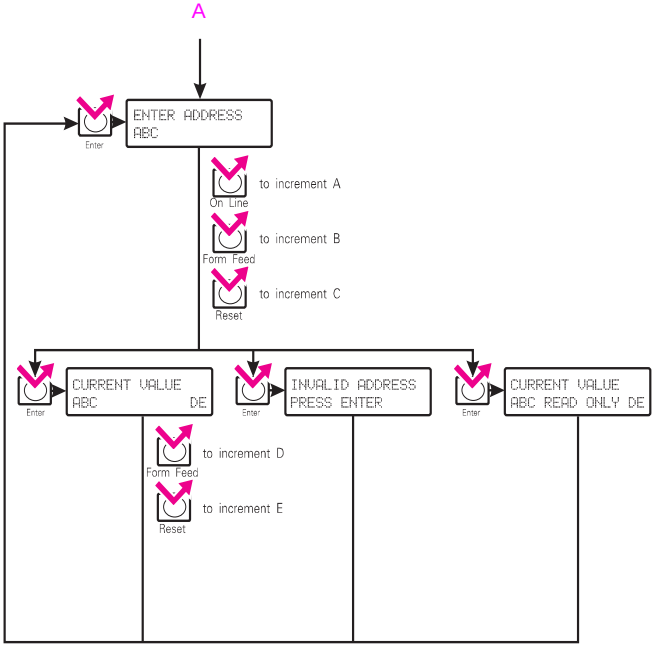
The Register Adjust Mode allows the service engineer access to the NVRAM address. Changing the value of this address allows the paper registration to be adjusted. This mode also provides detailed developer counter information that is needed for troubleshooting toner concentration.

Note

This mode does not affect the operation of solenoids or sensors. Use the Status and Test Mode on page 92 to monitor and test the solenoids and sensors.

Accessing the Register Adjust Mode

1. Enter Service Mode as described in the previous section.
2. Repeatedly press **Menu** to display ENGINE SERVICE.
3. Press **Item** to display REGISTER ADJUST.
4. Press **Enter** to activate the Register Adjust Mode.
5. Use **Online**, **Form Feed**, and **Reset** to increment the address digits until the desired address is displayed.
6. Press **Enter** to obtain the address value.
7. Use **Form Feed** and **Reset** to change the address value to the desired value.
8. Press **Enter** to save the new value.
9. If the address is invalid or appears as read-only, press **Enter** to select a new address.
10. Power cycle the printer to continue normal operation.



Keystroke sequence to enter Register Adjust Mode

Register Adjust Mode addresses

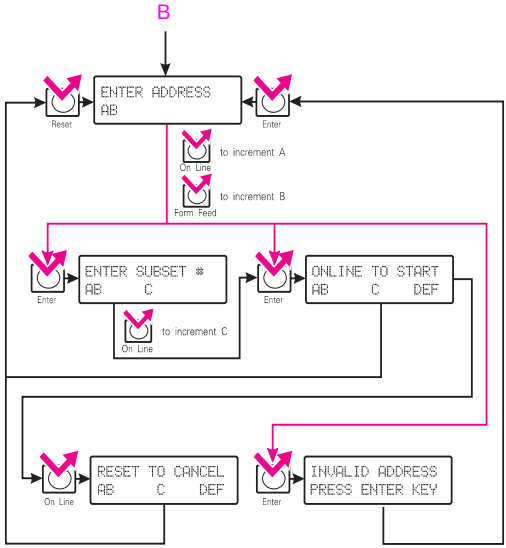
This table lists the accessible addresses in the control NVRAM.

Register adjust addresses

Address	Initial value	Function
28	00*	Black developing unit counter (10s & 1s digit). Range = 00-99
29	00*	Black developing unit counter (1000s & 100s digit). Range= 00-99
30	00*	Black developing unit counter (100,000s & 10,000s digit. Range=00-99
31	00*	Yellow developing unit counter (10s & 1s digit). Range = 00-99
32	00*	Yellow developing unit counter (1000s & 100s digit). Range= 00-99
33	00*	Yellow developing unit counter (100000s & 10000s digit). Range = 00-99
34	00*	Magenta developing unit counter (10s & 1s digit). Range = 00-99
35	00*	Magenta developing unit counter (1000s & 100s digit). Range = 00-99
36	00*	Magenta developing unit counter (100000s & 10000s digit). Range = 00-99
37	00*	Cyan developing unit counter (10s & 1s digit). Range = 00-99
38	00*	Cyan developing unit counter (1000s & 100s digit). Range = 00-99
39	00*	Cyan developing unit counter (100000s & 10000s digit). Range = 00-99
47	00**	Fuser error code (00 - 01)
74	48***	Leading edge margin adjustment for RFU auto-feed. Range = 35-65
75	43***	Side margin (start of scan) adjustment for RFU auto-feed. Range = 01-99
76	48***	Leading edge margin adjustment for manual feed. Range = 35-65
77	43***	Side margin (start of scan) adjustment for manual feed.Range = 01-99
78	48***	Leading edge margin adjustment for main tray. Range = 35-65
79	43***	Side margin (start of scan) adjustment for main tray. Range = 01-99

* These are read-only values.
** This register can be reset to 00 to clear 50.X Fuser errors without waiting for the fuser error timeout.
*** Default values

Status and Test Mode



Selecting the status and test addresses

The Status and Test Mode allows the service engineer access to individual printer components. Access the Status and Test Mode from the Service Mode menu. Enter Service Mode as shown on page 87 and then complete the following steps:

1 Repeatedly press **Menu** to display ENGINE SERVICE. The first selection is REGISTER ADJUST.

2 Press **Item** to select the Status and Test Mode.

3 Press **Enter** to activate the Status and Test Mode.

4 Use **Online** and **Form Feed** to increment the address digits until the desired address is displayed.

5 Press **Enter** to activate the displayed address.

6 If necessary, input the subtest number by pressing **Online** until the desired subtest number is displayed.

7 When ONLINE TO START is displayed, the printer is in Status Mode. The number on the right is the status value for the address that was entered in step 5. This value is updated once every second.

8 Press **Reset** to cancel the Status Mode.

9 Press **Online** to activate the Test Mode. The printer starts the test for the address entered in step 5.

10 Press **Reset** to cancel the Test Mode.

Status and test addresses

The addresses listed in the “Status and test address” table on page 94 select the function shown in the status column or enable the test listed in the test column. Status shows the state of the switch, sensor, or other component that the control board responds to. Subtest numbers also apply to some of the tests (such as developer tests). Subtest numbers select a particular subtest (such as black developer) when more than one function is possible. Subtest numbers are listed separately on page 97.

Note

Status and test codes are not coded together and therefore may not match. Many status outputs and test functions share an address. For instance, when address 20 is entered, the display shows the status of the registration sensor. Pressing **Online** activates the paper-feed solenoid.

Status and test address

Address	Status	Test
01	Toner level detection. Shows logic of the toner level detect sensor for the selected color. 1=toner present, 0=toner empty	
08	Toner concentration sensor signal for the selected color. The initial value is 63. Starting the test displays the current concentration offset value.	Rotates the developing unit for the selected color. You should hear the developer rotate when this test is run.
10	Paper empty (main tray). Indicates the state of the paper-out sensor (PS8). 1=paper present, 0=paper empty	
13	Rear input empty sensor (RFU). 1=paper empty, 0=paper present	
14	Paper empty sensor (RFU manual feed). 1=paper not present, 0=paper present	
15	Paper size signal (tray). Indicates the detected tray size: lgl=0, ledger (tabloid)=1, Ltr=2, Exec=4, A3=5, A4=6, No tray=7	
16	Paper size signal (RFU). Indicates the state of the RFU paper size sensor: 1=A4, 2=exec, 3=ltr.	
19*		Unlocks all toner hoppers
20*	Registration sensor signal. (PS7) Indicates the state of the registration sensor. 1=paper detected, 0=paper not detected	Turns on the paper tray solenoid (SL1)
21	Rear feed unit paper-in-path sensor. Detects media in the RFU.	
22	Paper exit sensor signal, indicates the logic states of the paper exit sensor. (PS1) 1=paper not detected, 0=paper detected	
25*		Turns on the registration solenoid (SL2)

* This address has an automatic shut-off to protect the component from extended use.

Status and test address (continued)

Address	Status	Test
28		Turns on the RFU drive motor
29*		Turns on the face-up and face-down solenoid (SL3)
30*		Turns on the exit roller position select solenoid (SL7)
37		Changes the fuser fan to high speed
40		Turns on the main motor. (The top cover must be closed.)
41	Door switch signal, indicates the state of both the door switches (top cover and side door). 1=door closed, 0=door open	
42		Changes the main fan rotation to high speed.
45		Turns on the fuser heat lamp (monitors the fuser thermistor voltage value). A cold fuser should display a value of about 120 +/- 8. A fully heated fuser should be about 25 +/- 8.
47		Calibrates the drum wrap sensor.
50	Developer select sensor signal; Indicates the state of the developer select sensor signal. 1=home position detected, 0=home position not detected	Turns on the developer select motor. The developer select motor turns to the home position. 1 is briefly displayed when the home position is sensed.
51	Pressure cam home position sensor signal. Indicates the state of the pressure cam home position sensor. 1=home position detected, 0=home position not detected	Turns on the developer drive motor
52*	RFU installation signal. Indicates the state of the RFU installation signal. 1=not installed, 0=installed	Turns on the toner supply solenoid (SL5)

* This address has an automatic shut-off to protect the component from extended use.

Status and test address (continued)

Address	Status	Test
53*	Displays the engine ROM version.	Turns on the pressure cam solenoid (SL4)
54	Excess toner collection box installed, indicates the state of the collection box and drum cartridge installed sensor. 1=not installed, 0=installed	Releases the cleaning blade from the print drum
55	Excess toner collection box full. Indicates the state of the collection box sensor signal. 1=collection box full 0=collection box not full	
56	Drum cartridge new detect signal. Indicates the state of the drum cartridge new sensor. 1=used, 0=new	
57	Indicates the state of the black developer unit new sensor. 1=used, 0=new	
58	Color developer unit new detect signal Indicates the state of the color developer unit new signal. 1=used, 0=used	
59	OHT sensor signal. Indicates the level of the OHT sensor signal in 128 levels.	Turns on the overhead transparency sensor LED
62	Transfer assembly unit new detect signal Indicates the state of the transfer assembly new signal. 1=used, 0=new	
63	Fuser unit new detect signal Indicates the state of the fuser unit new signal. 1=used, 0=new	
67 (CLJ)	Oil pad new detect signal Indicates the state of the oil pad new signal. 1=used, 0=new	
67 (CLJ5)	Cleaning roller new detect signal Indicates the state of the cleaning roller new signal. 1=used, 0=new	

Subtests

Subtests allow the service engineer to check both the input and output of the listed components and subassemblies. When using this mode, first enter the test address and then the subtest number.

Subtest number list

Address	Subtest #	Status/response
01	0	Checks the state of the black toner level sensor
	1	Checks the state of the yellow toner level sensor
	2	Checks the state of the magenta toner level sensor
	3	Checks the state of the cyan toner level sensor
08	0	Shows the current level of the black toner concentration sensor. Rotates the black developing unit
	1	Shows the current level of the yellow toner concentration sensor. Rotates the yellow developing unit
	2	Shows the current level of the magenta toner concentration sensor. Rotates the magenta developing unit
	3	Shows the current level of the cyan toner concentration sensor. Rotates the cyan developing unit
19	0	Unlocks the black toner hopper
	1	Unlocks the yellow toner hopper
	2	Unlocks the magenta toner hopper
	3	Unlocks the cyan toner hopper
28	1	Turns on the RFU motor

Subtest number list (continued)

Address	Subtest #	Status/response
40	0	Rotates the main motor at full speed. The main motor is driven by index pulses (locked to the scanner).
	1	Rotates the main motor at half speed. The main motor is driven by index pulses (locked to the scanner).
	2	Rotates the main motor at 1/6 speed. The main motor is driven by index pulses (locked to the scanner).
	3	Rotates the main motor at full speed. The main motor is driven by CPU pulses.
	4	Rotates the main motor at half speed. The main motor is driven by CPU pulses.
	5	Rotates the main motor at 1/6 speed. The main motor is driven by CPU pulses.

Humidity sensor test

The humidity sensor controls several operating parameters. It is important to know the room humidity to test that the sensor is working properly. Note that air-conditioned areas have different humidity levels (probably lower) than the air outside. Use these steps to run the humidity test:

1 Perform a control panel self-test. Check the “internal humidity” line (see “Understanding the self-test printout” on page 64) to determine if the printer’s internal humidity is close to the room humidity.

Note

Printer humidity is usually 2 percent to 5 percent lower than the room humidity. If the variation is larger than this, the humidity sensor may be defective.

2 Remove the toner hopper cover to expose the humidity sensor mounted on the toner sensor board (See page 128 for the location of the toner hopper cover). Print another self-test.

3 Turn the printer off.

4 Breathe on the humidity sensor. This should raise the humidity of the sensor above the room humidity.

5 Immediately turn the printer on and print another self-test.

6 Compare the two humidity values. If the second value is not higher, replace the humidity sensor.

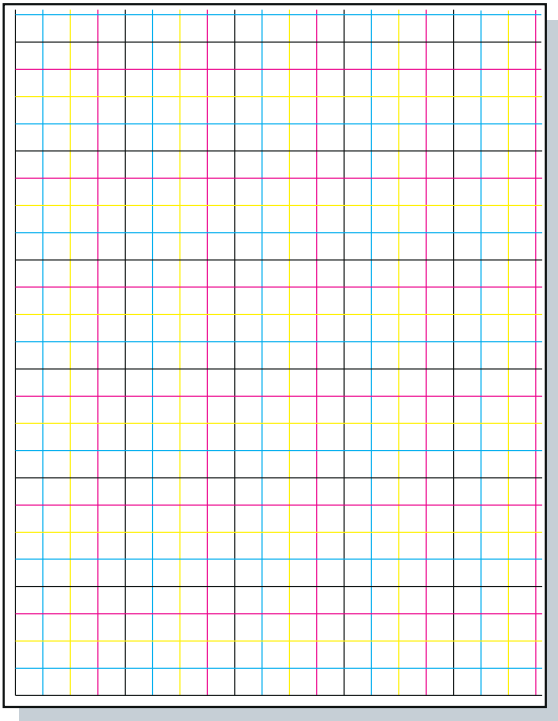
15 Engine test

The 15 ENGINE TEST prints a color grid pattern page, independent of the formatter PCA. This test can be printed even if the formatter or control panel is not working. Use this test to help isolate functional problems. The photograph below shows the location of the test print switch. To perform an engine test, use a non-metallic object to press in the test switch. The 15 ENGINE TEST printout is shown later in this chapter.

Note

The formatter must be installed to run the engine test on the HP Color LaserJet printer.

15 Engine test print switch



15 Engine test printout

Note

For a color version of the 15 Engine test printout, see the printer service manual.

Half self-test

The electrophotographic process can be divided into the following stages:

- charging (charge corona)
- exposing (laser modulation)
- developing (formation of the toner image on the drum)
- transferring (toner placement on the page)
- fusing
- cleaning (physical and electrostatic)

The half self-test checks that the image is being written and developed onto the print drum before it is transferred to the page. This test determines whether image formation problems are associated with development of the image or in a later process.

To perform the half self-test:

1. Perform an 05 self-test.
2. Listen for the registration solenoid engaging and wait one second before turning off or opening the printer. The leading edge of the page should be on the transfer belt.
3. Open the printer and inspect the image on the print drum.

If a sharp and clear image is fully developed on the print drum, assume the first four steps of the image formation process are working. Troubleshoot the failure as a transfer problem or a problem that occurs later (such as a fuser problem).

If no image is developed on the drum or the image is poorly developed, perform the drum rotation functional test (see page 102).

Note

It may take several test attempts to stop the page at the correct moment.

Drum rotation functional test

The print drum must turn for the print process to work. The print drum receives its drive from the main motor assembly. If the drive gears are worn or the gears do not mesh correctly, the print drum may not turn. Check the drum rotation:

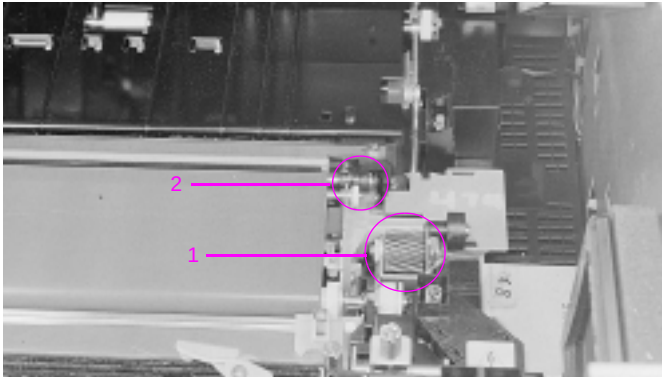
1 With the printer turned on, open the top cover.

2 With a fine-point felt pen, mark the silver area of the aluminum cylinder of the print drum. Note the position of the mark.

3 Close the top cover. The start-up sequence should rotate the drum and move the mark.

4 Open the printer about one second after start-up and check that the mark has moved. If it has not, the problem is either gear engagement or main motor rotation.

5 The spring-loaded drum drive gear (shown below) may be stuck in the retracted position. Check that the spring is not broken and that the gear is free throughout its full range of travel. Toner may accumulate around the gear and spring, inhibiting the gear from engaging. Find the cause of any accumulated toner before returning the printer to service. Thoroughly clean the printer and replace the springs if necessary.



Spring-loaded drum drive gear

Toner contamination in the transfer area

If a large amount of toner is accumulated in the transfer area, you must identify the source of the toner as soon as possible.

Note

Accumulated toner causes print-quality problems and may lead to additional service calls.

To identify the source of accumulated toner:

1. Ensure that all maintenance units are within their rated life. Replace any that have exceeded their maximum life as listed on the self-test page.
2. Check the position of the transfer corona cleaner. Ensure it is all the way to the right.
3. Visually examine the transfer belt (do not touch it). If it is contaminated with toner, the transfer belt's internal cleaning system may not be working.
   - Check the high-voltage contacts (the springs in the plastic housing). They should be within 1 millimeter of the top of the housing.
   - Replace the transfer assembly if it is excessively dirty.
4. Examine the developers. Replace any developer that shows signs of excessive leakage.
5. Examine the toner collection box. Check the auger and seals. Replace the print drum and the toner collection box if toner is leaking here. If the toner collection box is overfilled, see the procedure given for "14.5 Replace collection box and "16.5 Replace collection box" in Chapter 1.
6. Perform a self-test and examine the print drum. Replace the drum if toner is being developed in the background or the non-image areas.

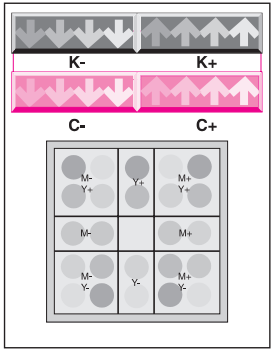
Color balance adjustment (Color LaserJet 5/5M)

Note

Adjusting the color balance will change your printer hardware. Perform all of the troubleshooting methods before attempting the following procedure.

1 Print a self-test page.
The self-test page displays the last set of saved color settings and provides a record of your initial settings before any adjustments. The factory setting for each color is 0 (other possible setting include -2, -1, and 2).

2 Turn the printer off.

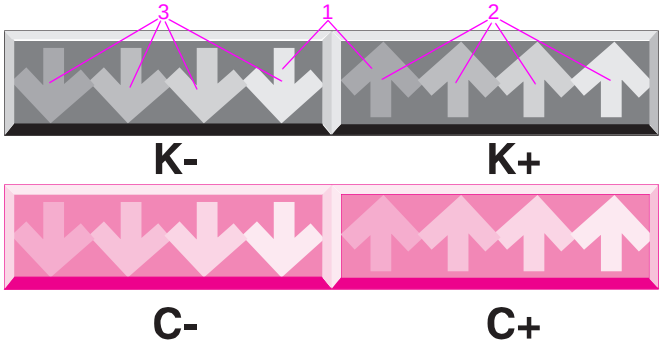


Color balance test page

3 Print a color balance test page.
While holding down the **Menu** and **Enter** keys on the front panel, turn the printer on. The printer display should read `COLOR BALANCE TEST PAGE`. (If this is not shown in the display, press **Item** until it is.) Press **Enter** to print the Color Balance test page. The test page consists of two color bars (black and cyan) and a box of color balance circles (see the color balance test page shown above).

4 Adjust the black (K+/K-) density setting.
Examine the black bar from a distance of 6 feet (2m). If the two center arrows (see item 1 in the following illustration) blend into the background of the black bar, the black density does not need to be adjusted (continue with the cyan setting). If one set of arrows (left or right of center) is more visible on the black strip, do the following:

- Press **Item** to get the K density display.
- If the four arrows on the right (see item 2 in the following illustration) are more visible, the density needs to be increased. Press the **+** key once.
- If the four arrows on the left (as shown in the following graphic) are more visible, the density needs to be decreased. Press the **-** key once.
- Press **Enter** when finished.

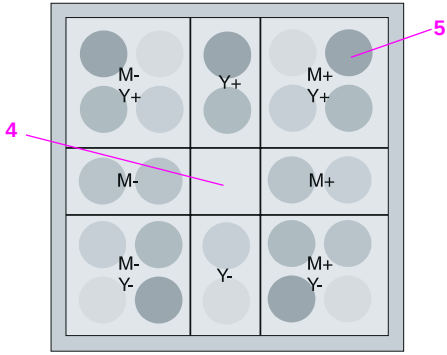


Adjusting black and cyan density settings

5 Adjust the cyan (C+/C-) density setting.

- Press **Item** to get the C density display.
- Repeat the last three items in step 4, this time using the cyan bar.

6 Reprint the color balance test page.
Press **Item** until COLOR BALANCE TEST PAGE is displayed on the front panel. Press **Enter**. A new test page will print. Examine the black and cyan bars. If the two center arrows blend into their respective backgrounds, go to step 9. Otherwise repeat steps 4 and 5 (the maximum color density setting is +2 and the minimum is 2).



Adjust magenta and yellow density setting

7 Adjust the magenta and yellow density settings.

- Examine the color balance circles from a distance of 6 feet (2 m). Determine which circle blends in best with the background.
- Make note of the magenta (M) and yellow (Y) density adjustments (for example, M+, Y+ for item 5 in the previous illustration) for that circle.
- If the center circle (See item 4 in the previous illustration) blends into the background better than any other circle, the magenta and yellow densities do not need to be adjusted (go to step 10).

8 Using the density adjustment values from step 7, adjust magenta and yellow densities as follows:

- Press **Item** to select M density. Press **+** once, or press **–** once to increase or decrease the M density value. Press **Enter** when complete.
- Press **Item** to select Y density. Press **+** once or press **–** once to increase or decrease the Y density value. Press **Enter** when complete.

9 Reprint the color balance test page. Press **Item** until `COLOR BALANCE TEST PAGE` is displayed on the front panel. Press **Enter**. A new test page will print.

10 Press **Online** to continue (the maximum density setting is +2 and the minimum is -2).

Cold reset

Cold reset clears all data from the print buffer and returns the printing menu and the configuration menu to the factory default settings (see Table 7-8 on page 7-117 of the printer service manual).

To perform a cold reset

1. Press **Online** while powering on the printer.
2. Release **Online** when the control panel lights are on. The display will read `00 COLD RESET`.
3. The cold reset is complete when the display reads `05 SELFTEST`.

Error log

The printer retains the last 50 errors in its error log. These errors are limited to service errors (50-89) and paper jam entries.

Error Log Mode

Error Log Mode displays the error log as one of the menu items and makes the error log available for immediate review.

To place the printer in Error Log Mode:

1. Hold down **Form Feed** while turning on the printer.
2. The printer will go through its normal cycle and will display the `00 PCL READY` message.
3. Take the printer off-line to view the error log entries.
4. Press **Menu** until `ERROR LOG` appears (the first error log entry is displayed). Then press **+** or **-** to scroll through the error log entries, or press **Enter** to print the error log.

The first example, shown below in the Error log example table, displays a 50.1 error as it appears in the error log. The code appears on the control panel display as 01 500001 000561. The order of information displayed is the same as the table. The first error in the list is the most recent.

Error log example

Error number	Error type	Sub-error	Page count (total)
01	50	0001	000561
02	54	0001	000320

Extended diagnostics

Extended diagnostics is a troubleshooting program that tests the MIO, formatter PCA, memory, and communication channels. Use extended diagnostics to test the printer when formatter, memory (DRAM only), and MIO-related errors persist. These tests should be run in all cases where one of the PCAs listed above is suspected as the cause of control panel error messages. These tests quickly isolate the problem to a specific PCA and will help reduce printer downtime.

Note

Extended diagnostics are especially effective for isolating intermittent communication failures. Extended diagnostics also verify suspected failures in formatters, MIO cards, or memory. Run extended diagnostics whenever a failure code appears that is associated with one of these assemblies.

The results of extended diagnostics appear in an error log separate from the log kept for running hardware errors such as paper jams. This log is available only in the Extended Diagnostics Mode. All entries are lost when the printer is turned off.

Note

Completion of the extended diagnostic test indicates that the test passed.

Initiating the extended diagnostic test

1. Turn the printer off.
2. Press and hold **Reset**, **Menu**, and **+** simultaneously, while turning the printer on. (The control panel will be blank if this is done correctly.)
3. Press **Item** and then press **Enter**.
   - The control panel reads `EXTENDED DIAGNOSTICS`.
   - `EXTENDED DIAGNOSTICS MODE` is displayed briefly, all the lights turn off, and the `EXT DIAG MENU` is displayed.

Note

The printer must be fully warmed-up (ready to print) and have a paper tray (with paper) installed in order to successfully complete these tests.

Color LaserJet printers with A4 size paper must have the printing portion of the extended diagnostics disabled. If the printing portion is enabled, extended diagnostics will fail.

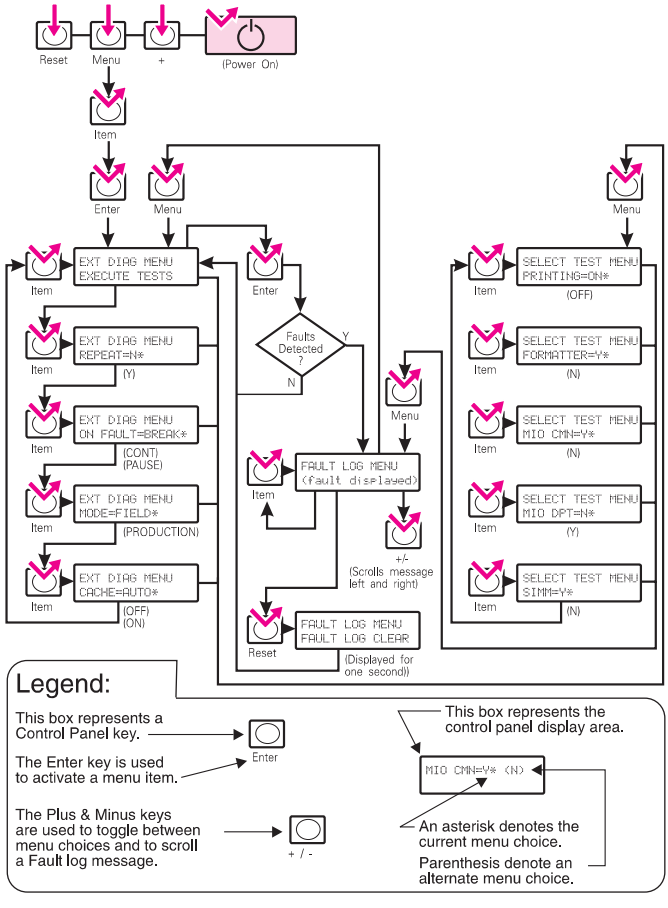
Extended diagnostic test options

Each test selection can be enabled or disabled. Selected tests can be run once or continuously. The online light flashes while the tests are running. Flashing indicator lights indicate an error was detected and logged. The extended diagnostic test selections are listed in the flowchart shown later in this chapter. The options are:

- `Repeat Y/N*` Use this selection for continuously repeating the test suite. It is especially useful when troubleshooting intermittent failures in any of the tested assemblies.
- `ON FAULT=BREAK*/CONT/PAUSE` This selection sets the Interrupt Mode when failures occur.
  - `BREAK` logs the first detected failure and stops the tests.

- CONT logs all failures and continues testing until **Reset** is pressed. When repeat is set to no, CONT continues testing until all selected tested have executed. When the test in process completes, if errors were detected (indicated by a flashing ERROR light), the FAULT LOG MENU is displayed. If no errors occurred, the extended diagnostics menu is displayed.
- PAUSE logs the failure and stops the test. The tests continue when **Enter** is pressed.

- MODE=FIELD*/PRODUCTION Do not use the Production Mode.
- CACHE=AUTO*/OFF/ON Do not change the default setting. The automode tests the cache with a separate test and automatically turns the cache ON when it passes its test.
- PRINTING=ON*/OFF The printing subtests test all primary and process colors, then turns off one color at a time. The tests exercise the ability of the formatter to control the print engine.
- FORMATTER=Y*/N The default (Y) tests formatter functionality. This is the recommended mode.
- MIO CMN=Y*/N - N (ND*), Y (ND) The MIO CMN (common) test is the default. N disables this test. MIO common means these tests are generic to any MIO configured for this printer. (ND) indicates that no MIO was detected at power on. However the test may still be enabled to run by selecting Y (ND).
- MIO DPT= N*/Y - N(ND), Y(ND) This selection enables the MIO dependent tests. (ND) indicates that no MIO was detected at power on. However the test may still be enabled by selecting Y (ND). **This test requires a loopback connector**.
- SIMMs=Y*/N - N(ND), Y(ND) This selection enables the DRAM tests. (ND) indicates that no DRAM was detected at power ON. If ND appears in the display at power on and DRAM is installed, the memory may be defective. Before replacing the memory, check that the formatter connectors are fully seated and in good repair.



Extended diagnostics flowchart

Solenoid test diagnostics

For solenoid and sensor functions and locations, see Chapter 6, page 139.

Solenoid test diagnostics

Solenoid	Address	Description	Comment
SL1	20	paper feed	
SL2	25	registration	
SL3	52	toner supply	
SL4	53	transfer cam	Listen for solenoid as it is energized.
SL5	29	face-up/face-down	Listen for solenoid as it is energized.
SL6	19 subset #0 subset #1 subset #2 subset #3	toner lock black yellow magenta cyan	Open toner hopper cover door. Observe the individual hopper fingers move as the subtest is initiated.
SL7	30	paper exit (used for transparencies)	Listen for solenoid as it is energized.

Motors/fans test diagnostic

	Address	Description	Comment
M7	28	rear feed unit	
M1	40	main motor	
M3	50	developer select	short rotation
M2	51	developer drive	

4 Media specifications

Overview

Use media that meet the specifications listed on the following pages. By doing so, you will minimize the incidents of paper jams, prevent premature wear to the printer, and reduce repair costs. Hewlett-Packard recommends testing print media before buying it in large quantities.

Note

For complete paper specifications for all LaserJet printers, see the *HP LaserJet Printer Family Paper Specification Guide*.

Media supported by front input tray

The media size for each front input tray is labeled on the front-right corner of the tray. The printer detects the size of media in the input trays.

The printer automatically detects transparencies.

CAUTION

Using unsupported media, specifically envelopes and labels, may cause printer damage. The table below lists the sizes and types of media supported by each input tray.

Supported media

Tray	Media type	Media size	Number of sheets	Media weight
Front Input Tray	Paper	Letter/A4 Executive Legal Tabloid (B-size)/A3	250*	75.2 to 90.2 g/m^2 20 to 24 lb
Front Input Tray	Transparencies	Letter/A4	50	0.13 mm (0.005 in.) thick **
Rear Feed Unit (optional)	Paper	Letter/A4	250*	75.2 to 90.2 g/m^2 20 to 24 lb
Rear Feed Unit (optional)	Transparencies	Letter/A4	50	0.13 mm 0.005 in thick **
Manual feed (optional)	Paper	Letter/A4 Executive Legal Tabloid (B-size)/A3	Single	75.2 to 90.2 g/m^2 20 to 24 lb
Manual feed (optional)	Transparencies	Letter/A4	Single	0.005 in thick *

* Up to 250 sheets or 25.4 mm (1 in), depending on paper weight and type.

** Use only HP supported transparencies (HP part number C2934A, letter size; C2936A, A4 size)

Print media checklist

- Rough paper causes poor transfer and smeared print problems. Check that the paper meets HP specifications for smoothness.
- When in doubt about supported media, use HP multi-purpose paper.

Note

HP Glossy media is supported on the Color LaserJet 5/5M. Glossy (shiny) paper is specifically not supported on the Color LaserJet because it cannot tolerate the temperatures required to fuse the toner.

- Envelopes are specifically not supported. Attempting to feed labels or envelopes from the input trays or manual feed slot can cause printer damage.
- Labels are specifically not supported. Attempting to feed labels or envelopes from the input trays or manual feed slot can cause printer damage.
- Use only 75.2 to 90.2 g/m^2 (20- to 24-pound) media.
- Paper that has absorbed moisture causes paper-feed problems.
- Duplexing is specifically not supported. Do not attempt to re-feed paper or to print on both sides of a page.
- Damaged paper, paper with ragged edges, or paper having edges that stick together will cause paper jams.
- Use only HP-supported transparencies (HP part number C2934A for letter size; C2936A for A4).
- No more than 50 transparencies should be loaded into any tray.
- Not all pre-printed letterhead inks and paper are compatible. Some inks could contaminate the fuser or other points in the paper path.

Note

Transparencies created on this printer appear darker when used on reflective-type transparency projectors.

CAUTION

Duplexing (printing on both sides of the page) or feeding paper that has already been through a laser printer or copier can cause paper jams. Duplex printing is not supported and will damage the printer.

If your printer is having trouble with paper jams, multi-feeds, or misfeeds, use HP-brand paper: HP 75.2 g/m^2 (20 lb) Multi-Purpose Paper, part number 9300-2092; HP 90.2 g/m^2 (24 lb) LaserJet Paper, part number 9300-2091.

General tips

Paper curl

Paper curl results from both the heating process used to bond the print image (toner) to the paper and from the path that the paper must negotiate through the printer.

Take the following actions to help reduce paper curl:

1. Turn the paper over in the input tray. Some paper packages (reams) have an arrow indicating the preferred printing side. Experiment to determine which orientation yields the least curl.
2. Try a different output paper path (if available for your printer). Using the face-up output path may yield more acceptable results than the standard face-down output bin.
3. Protect the paper from adverse environmental conditions prior to use. Paper designed for laser printing has an initial moisture content of 4-6 percent which is maintained as long as it is stored properly. Once the paper has been removed from its packaging it will dry out or absorb additional moisture, depending on the environment. Excess moisture in the paper will increase the amount of curl.
4. Try a different type or brand of paper. Not all paper is designed for laser printing.
5. Heavy toner coverage may result in more curl.

Much of the paper curl that is induced by the laser printer fusing process will tend to relax within the first 24 hours following printing. However, the curl on the leading edge of the page may remain longer because the leading edge tends to remain in contact with the fusing roller for longer periods.

Preventing printer malfunctions caused by transparencies

Note

To ensure proper performance, use media specifically designed for the HP Color LaserJet or HP Color LaserJet 5/5M.

Use these tips to prevent printer malfunctions caused by transparencies:

- Use media designed for the HP Color LaserJet printers.
- Use the straightest paper path to avoid curling and other problems.
- Use transparencies with the correct resistivity.
- Use transparencies that meet HP specifications for fusing compatibility.
- Remove each printed sheet from the tray and place it on a flat surface before printing the next sheet.

5 Printer options and replaceable parts

Overview

This chapter provides information on printer options and replaceable parts including product name, product number, product description, and service part numbers.

Maintenance units, accessories, and supplies

All standard part numbers are stocked and can be ordered from PSD Materials North America or PSD Materials Europe.

Note

Parts that have no reference designator or part number are not field replaceable and cannot be ordered.

The following items are available through your local authorized HP dealer. To find a dealer near you (or if your local dealer is temporarily out of stock), call the HP Customer Information Center at 1-800-752-0900

Note

See “Ordering Related Documentation” in Chapter 1 of the Service Manual for documentation part numbers.

Consumable parts and accessories are available directly from Hewlett-Packard at the following numbers:

- U.S.: 1-800-538-8787
- Canada: 1-800-387-3154 (Toronto: 1-416-671-8383)
- United Kingdom: 0734-441212

Contact your local HP Parts Coordinator for other local phone numbers.

Consumables and accessories

Part No	Description	Part No	Description
C3967-67901	Drum cartridge	C3116A	Executive-size tray
C3966-67901	Color developer	C3117A	A3-size tray
C3965-67901	Black developer	C3118A	11x17-size (tabloid) tray
C3968-67901	Transfer assembly	C3112-69001	PostScript Level II (C3100A only)
C3969-69001	Fusing assembly (110V)	C3963-69001	PostScript Level II (C3961A only)
C3969-69002	Fusing assembly (220V)	D2150-69001	1Mbyte SIMM
*C3964-67901	Coating kit	D2381-63001	2 Mbyte SIMM
C3120A	Toner collection kit	D2156-69001	4 Mbyte SIMM
C3102A	Cyan toner	D2152-69001	8 Mbyte SIMM
C3103A	Yellow toner	D2747-69501	16 Mbyte SIMM
C3104A	Magenta toner	D2298-69001	32 Mbyte SIMM
C3105A	Black toner	J2550-69013	EtherNet (10Base-T)
C3119-69001	Rear feed unit	J2552-69013	EtherNet combo
C3113A	Letter-size tray	J2552-69013	HP JetDirect LocalTalk
C3114A	Legal-size tray	J2555-69013	Token ring
C3115A	A4-size tray		

*Compatible with fusing assembly C3969 only.

CAUTION

Use only HP SIMMs.

Miscellaneous parts

Part No	Qty	Description
C3112-69001	1	PostScript Level II SIMM (CLJ only*)
C3963-69001	1	PostScript Level II SIMM (CLJ 5/5M only**)
D2150-69001	1	1 mbyte SIMM
D2381-63001	1	2 mbyte SIMM
D2156-69001	1	4 mbyte SIMM
D2152-69001	1	8 mbyte SIMM
C2747-69501	1	16 mbyte SIMM
D2298-69001	1	32 mbyte SIMM
J2550-69001	1	Ethernet (10Base-T)
J2552-69001	1	Ethernet Combo
J2555-69002	1	Token Ring
J2371-69001	1	Ethernet MPS (10Base-T only)
J2372-69001	1	Ethernet MPS (10Base-T & BNC)
J2373-69001	1	Token Ring
J2341-69001	1	HP JetDirect LocalTalk
07BA12640KC	2	RFU Bracket Cover
C3099-60102	1	Shipping Material (need C3100-67905)
C3100-67905	1	Shipping Preparation Kit
07BA-1380KC	1	Optics Cleaning Tool
C3100-40003	1	Name Plate (CLJ*)
C3961-40001	1	Name Plate (CLJ 5***)
C3962-40001	1	Name Plate (CLJ 5M****)

* HP Color LaserJet Printer
** HP Color LaserJet 5/5M Printer
*** HP Color LaserJet 5 Printer
**** HP Color LaserJet 5M Printer

6 Parts and part locations

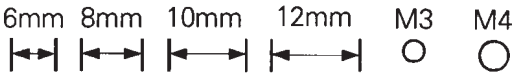
Overview

The following tables list the product, product number, product description, and service part number for each printer. Parts can be ordered through HP Parts Direct Ordering at (800) 227-8164 (U.S. only). For additional product support, see chapter 9 and the inside back cover.

Common hardware

Common fasteners used in the printer

Drawing	Description	Size	Part number
	Pan head	M3X4 M3x6	00Z183041KC 00Z183061KC
	Trus head	M3X4 M3X6 M3x8 M3X12	00Z193041KC 00Z193061KC 00Z193081KC 00Z193122KC
	Captive washer	M3X12 M4x6	00Z163121KC 00Z164061KC
	Bind head self-tap	M3x6	00Z253061KC

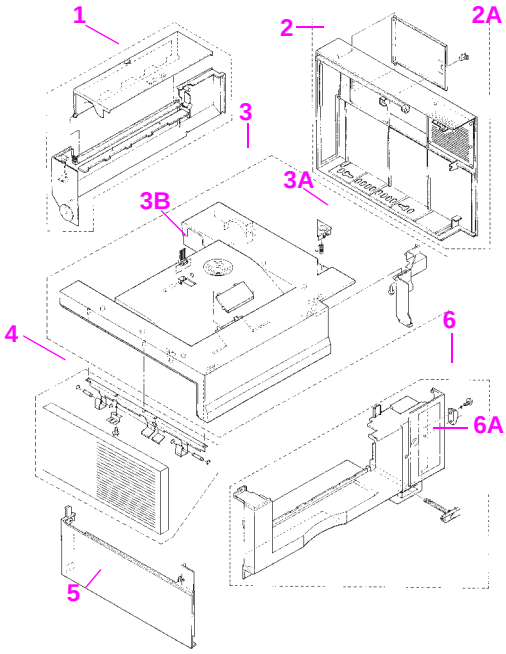


Common orderable parts

Service parts

Parts	Color LaserJet	Color LaserJet 5/5M
Control panel assembly	07BP-7000KC	07BP-7000KC
Developer drive assembly (110V)	07BA-1552KC	07BM-1552KC
Developer drive assembly (220V)	07BB-1552KC	07BP-1552KC
Formatter	C3100-69002	C3960-69002
Laser scanner assembly	C3100-69010	C3100-69010
Paper pick rollers	07BA-4062KC	07BA-4062KC
Rear feed unit	C3119-60001	C3119-60001
Registration plate	07AA401114KC	07AA40114KC
Registration solenoid (SL2)	07BA-4310KC	07BA-4310KC
Toner hopper assembly	07BM-3911KC	07BM-3911KC
PostScript SIMM	C3112-69001	C3963-69001
Paper exit assembly	07BA-5005KC	07BA-5005KC
Developer bias supply	07BA-7323KC	07BM-7320KC
DC controller	C3100-69001	C3961-69002
High-voltage power supply	07BM-7310KC	07BM-7310KC

External covers

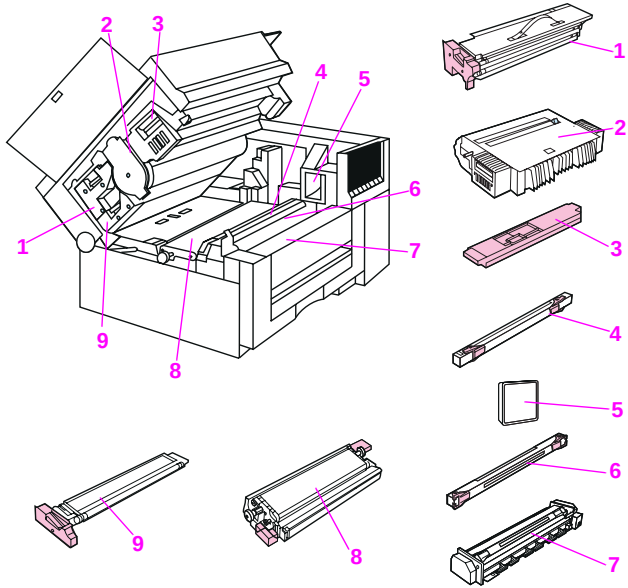


Location of external covers

External covers

Item number	Description	Part number
1	Cover, toner hopper	07BA-1162KC
2	Cover, right side	07BA-1150KC
2A	Door, SIMM access	07BA-1450KC
3	Cover, top	07BA-1441KC
3A	Top cover button	07BA12135KC
3B	Paper stop	07BA12582KC
4	Door, developer access	07BA-3160KC
5	Cover, left side	07BA-1370KC
6	Cover, front	07BA-1130KC
6A	Door, front	07BA-1430KC

Major assemblies



Location of maintenance units and consumables

Major assemblies

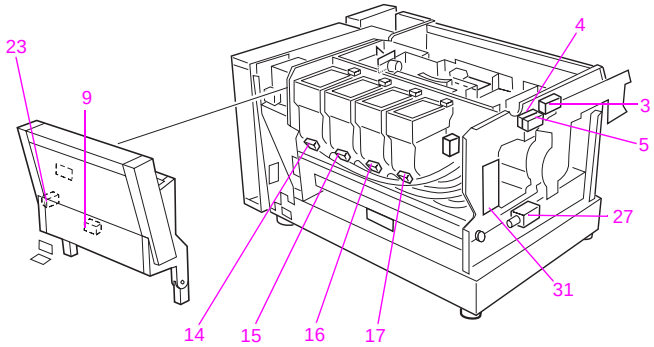
Item number	Product number	Description	Part number
1	C3108A	Color developer	C3966-67901
2	C3109A	Print drum (CLJ only*)	
2	C3967A	Print drum (full compatibility)	C3767-67901
3	C3120A	Toner collection kit***	
4	C3964A	Coating kit** (CLJ only*)	C3964-67901
5	N/A	Ozone filter (included with toner collection kit, above)	
6	N/A	Cleaning roller (included with coating kit, above)	
7	C3111	Fusing assembly (110 V) Fusing assembly (220 V)	C3969-69001 C3969-69002
8	C3968A	Transfer belt assembly	C3968-67901
9	C3965A	Black developer	C3965-67901
	C3115A	Paper tray - A4	
	C3113A	Paper tray- letter	
	C3105A	Toner, black	
	C3102A	Toner, cyan	
	C3104A	Toner, magenta	
	C3103A	Toner, yellow	

* HP Color LaserJet printer
** The coating kit includes the cleaning roller and coating roller.
*** The collection kit includes the toner collection box and ozone filter.

Note

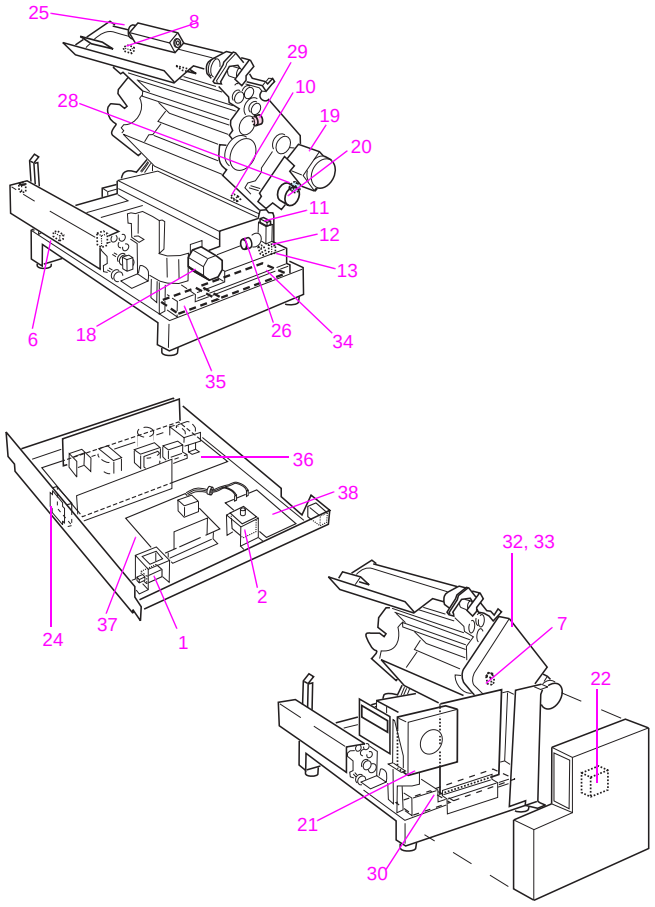
Do not install an old-style (blue) coating pad kit into a new-style fuser.

Electrical components



Motors, solenoids, and heater

Electrical components



Motor, solenoids, heater, boards, and others

Electrical components—switches and sensors

Item number	Switches and sensors	Description	Part numbers
1	SW1	Main switch	N/A
2	SW2	AC door switch	07BA86010KC
3	MS1	Interlock SW1	07BA-1070KC
4	MS2	Interlock SW2	07BA-1070KC
5	MS3	Interlock SW3	07BA-1070KC
6	PS1	Paper exit PS	684285520KC
7	PS2	Belt cam home position PS	684285520KC
8	PS3	Toner collecting box full detecting PS	684285520KC
9	PS4	Bypass feed no paper PS (not a replaceable part)	684285520KC
10	PS5	OHT detecting PS	07BA85545KC
11	PS6	Developer cam position PS	684285520KC
12	PS7	Paper feed PS	684285520KC
13	PS8	No paper PS	684285520KC
14	YTLD	Toner level detecting sensor (Y)	07AA88223KC
15	MTLD	Toner level detecting sensor (M)	07AA88223KC
16	CTLD	Toner level detecting sensor (C)	07AA88223KC
17	BKTLD	Toner level detecting sensor (Bk)	07AA88223KC

Electrical components—motor, solenoids, heater, and others

Item number	Switches and sensors	Description	Part numbers
18	M1	Main motor assembly	07BM-1504KC
19	M2	Developer drive assembly (110 V)	07BM-1552KC
19	M2	Developer drive assembly (220 V)	07BP-1552KC
20	M3	Developing control motor	07BA-1610KC
21	M4	Main body cooling fan	07BM-1081KC
22	M5	Formatter cooling fan (CLJ only)*	07BA-80534KC
23	M7	Bypass feed motor	N/A
24	M8	Power supply cooling fan	07BA80522KC
25	M9	Fuser cooling fan	07BA-1340KC
26	SL1	Pick roller solenoid	07BA-418OKC
27	SL2	Registration solenoid	07BA-4310KC
28	SL3	Toner supply solenoid	07AA82532KC
29	SL4	Cam solenoid	07BA-1640KC

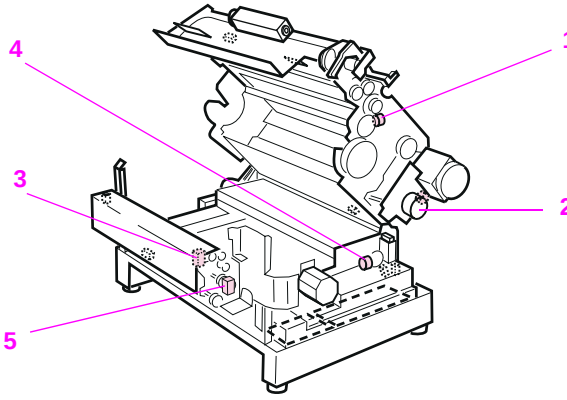
*HP Color LaserJet printer

Electrical components—motor, solenoids, heater, and others

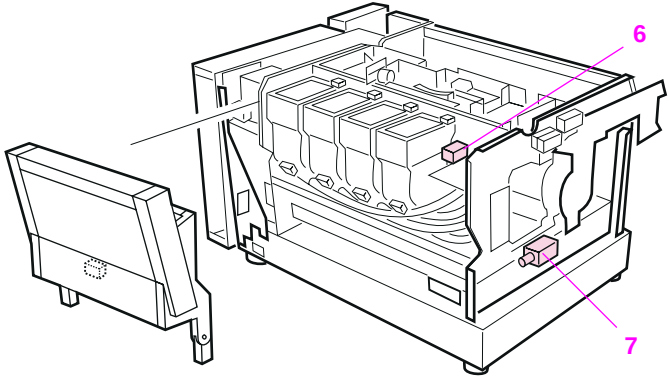
Item number	Boards and others	Description	Part numbers
30	CB	Control board (CLJ only)	C3100-69002
30	CB	Control board (CLJ5/5M only)	C3961-69002
31	TSB	Toner detect PCA	07BA-9696KC
32	DVRLB(A)	Developer bias supply	07BA-7323KC
33	DVRLB(B)	Developer bias supply (CLJ 5/5M only**)	07BM-7320KC
34	HVPS	High-voltage power supply (CLJ only*)	07BM-7310KC
35	HVPS	High-voltage power supply (CLJ 5/5M only**)	07BM-7310KC
36	DCPS	DC power supply (110V) (CLJ only*)	07BA84518KC
36	DCPS	DC power supply (220V) (CLJ only*)	07BB84518KC
36	DCPS	DC power supply (110V) (CLJ 5/5M only**)	07BM-1012KC
36	DCPS	DC power supply (220V) (CLJ 5/5m only**)	07BP-1012KC
37	ACPS	AC power supply (110V) (CLJ only*)	07BA-9206KC
37	ACPS	AC Power supply (220V) (CLJ only*)	07BB-9205KC
38	NF	Noise filter (110V) (CLJ only*)	07BA84525KC
38	NF	Noise filter (220V) (CLJ only*)	07BB84525KC

*HP Color LaserJet printer
**HP Color LaserJet 5/5M printer

Notes



Solenoid locations (1 of 2)



Solenoid locations (2 of 2)

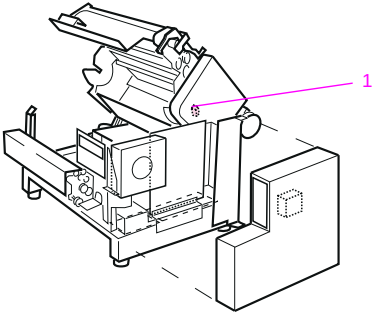
Solenoid and sensor locations and functions

Item	Solenoid	Function
1	Cam solenoid (SL4)	Engages the clutch, causing M2 to rotate the cam. (This lifts and lowers the transfer assembly and cleaning blade.)
2	Toner supply solenoid (SL5)	Engages the clutch, allowing M2 to drive the selected toner-supply auger
3	Face-up, face-down solenoid (SL5)	Switches exit claw position for face-up or face-down output
4	Paper feed solenoid (tray feed SL1)	Actuates the clutch to allow paper pick from the paper tray
5	Paper exit guide solenoid (SL7)	Lifts the fuser guide when printing transparencies
6	Toner hopper lock solenoid (SL6)	Unlocks the selected toner hopper
7	Registration plate solenoid (SL2)	Drops the registration plate

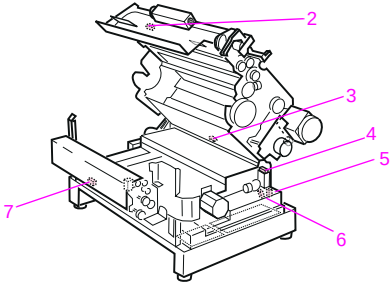
Sensor locations and functions

(See locations on the following pages)

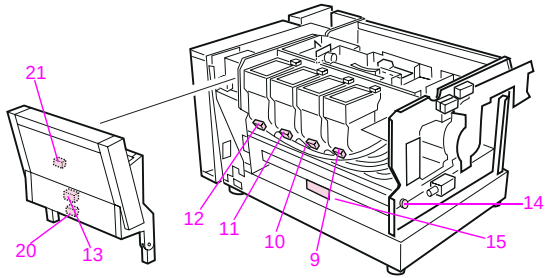
Item	Sensor	Function
1	PS2	Belt/cam home position sensor (senses the transfer belt and drum cleaning blades home position)
2	PS3	Collection box full sensor
3	PS5	Transparency detection sensor
4	PS6	Developer select home sensor (senses the developer select position)
5	PS7	Paper-feed (registration) sensor
6	PS8	Paper-out sensor
7	PS1	Paper-exit sensor. (detects media in the exit assembly)
9	Black Sensor	senses black toner empty
10	Cyan Sensor	senses cyan toner empty
11	Magenta Sensor	senses magenta toner empty
12	Yellow Sensor	senses yellow toner empty
13	PS4	RFU paper-out sensor (senses media in the RFU)
14		Humidity sensors
15		Paper-size sensors (CN103, B4-B7)
16 & 17		Fuser temperature sensors (TH2 and TH1)
18		Toner concentration sensor (1 for each developer)
19		Drum wrap sensor
20		RFU paper-in-path sensor
21		RFU manual feed sensor.



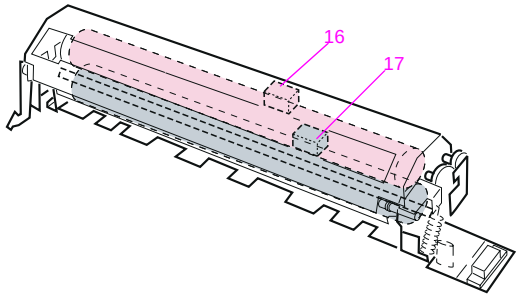
Belt cam home position sensor



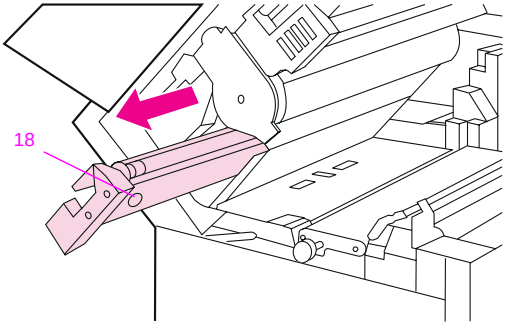
Internal sensor locations



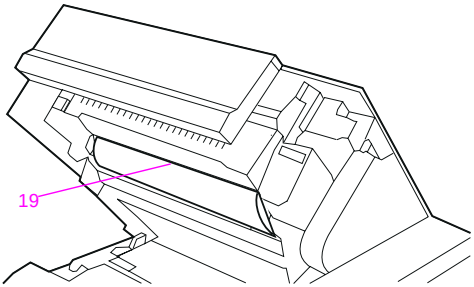
Rear sensor locations



Fuser sensor locations



Toner concentration sensor (1 for each developer)



Drum wrap sensor

7 Image quality

Overview

This chapter provides examples of image defects and a list of remedies.

Troubleshooting image formation

Note

Before beginning to troubleshoot image formation, check that the media meets the specifications listed in the *HP LaserJet Printer Family Paper Specification Guide*. It is recommended that you use HP multipurpose paper (20-lb), part number 9300-2091.

Print density test and color checks

Use the self-test page to check the print density (the black levels). The self-test page has solid black-filled areas that demonstrate the ability to print black at full density. The self-test page also tests the ability to print each primary and process color. To print the self-test page:

1. Take the printer off-line.
2. Press **Menu** until PCL TEST MENU appears.
3. Press **Item** until PCL SELF TEST appears.
4. Press **Enter** to start the self-test.

In addition to items listed above, the self-test:

- helps isolate the problem to the software or the printer hardware.
- shows that all colors print.
- checks that the room humidity is within specifications.

The following media-related items are responsible for many image formation and print quality defects:

- rough paper
- heavy paper
- transparencies out of the specified thickness range
- paper that has absorbed moisture from the atmosphere
- room environment (humidity too high or too low)

Understanding color variations

The printed page might not match the computer screen, and the colors printed on successive pages might not match each other. While color variations are inherent in this printing method, they also can indicate changes in the printing environment, print media, or printer components.

Common causes of color variation

The following list outlines the major causes of color variations between computers, applications, and output devices.

- Halftone patterns produced on monitors are different from the types of patterns used in the print jobs. The differences in the halftone patterns can cause variations in the printed output.
- The printed output differs from the image on the monitor because the monitor and the print media have different reference values of black and white.The monitor screen has charcoal gray for the black level, and the white on the monitor screen is actually blue. Black on print media is limited only by the fill capability of the printer, and most good quality paper has a very high white level. In addition, phosphor (used in color monitors) and toner have entirely different spectral characteristics and different color rendering capabilities. Differences between the display and the printed output are common. Blues generally match better than reds.
- The color of the ambient light changes the perception of color (on both the monitor and the printed page). Fluorescent light lacks many colors present in incandescent light, and the color range of natural light is broader than any artificial light. When comparing color, choose a standard light source for reference and understand that the perceived color will change as the light changes.
- Long-term color variations occur as the paper ages. The color of the page will change with time. Use high-quality paper, and protect the paper from sunlight to help minimize discoloration.

- Environmental changes can cause color variation. The development process places a high potential across an air gap to attract toner to the print drum. Changes in relative humidity vary the point at which the toner travels to the print drum. The printer has a humidity sensor that adjusts operating parameters as the humidity changes. This humidity sensor minimizes the effect of environmental changes.
- Print components become fatigued. All consumable components have a finite life span. As these items reach the end of their useful life, their ability to produce consistent print quality diminishes.
- Drums that have been overexposed to ambient light will not produce proper colors.

Color selection process

The actual color is selected in the software application, but the operating system can convert or modify some characteristics of the color before sending the information to the driver. Some applications will bypass the printer driver altogether.

The driver can modify color characteristics depending upon the selected output mode.

Any color characteristics not addressed by the driver or software applications are set to the printer default. The default color might not match the selection.

Matching screen colors

Matching of input, on-screen, and output colors is a very sophisticated process. The input device (scanner, keyboard, or mouse), software application, and output device each influence or limit the ability to select and produce printed color output.

To improve color matching between the printed output and the monitor:

- Turn off any color-matching features in the software application.
- Avoid light colors which the software application can interpret as white.
- Avoid dark colors which the software application can interpret as black.

- Select the custom colors option in the driver (manual color) and change the halftoning options to vary the shading and quality of the colors.
- Use the color calibration system in the printer driver to match the printer to the characteristics of the monitor. This is available through the manual colors option.
- Drums that have been overexposed to ambient light will not produce proper colors.

Inconsistent colors

Some degree of color variation among printers is to be expected. However, if the color of successive printouts is inconsistent, follow the procedure given below:

- Verify that the same colors are selected for each printout.
- Verify that the software application is working correctly by printing a color file from another application.
- Verify that the same paper is used for each printout. Differences in paper could affect color output.
- Verify that the printer is working correctly by printing a self-test page and verifying that the colors are not faded or bold.

Carryout (loose carrier)

Diagnose carryout (loose carrier on the page) by feeling the page for the gritty-feeling carrier. Loose carrier on the page indicates a poor connection to the print drum charging grid. Check the drum contacts. Pull the spring contacts up to within 1 mm (0.039 in) from the top of the plastic housing. If the carryout persists, replace the print drum.

Troubleshooting image quality problems

The following information describes various print problems and their causes. Use this information to assist in identifying, troubleshooting, and correcting the problems. Examples of image defects begin on page 173.

Background toner scatter

- Make sure that the paper meets HP media specifications.
- Check that the humidity reading shown on the self-test is within specifications.
- Check the connection between the drum and the high-voltage power supply (HVPS) for contamination.
- Replace any developer that has exceeded its maximum life.
- The toner concentration is temporarily too high. This can happen if both the fuser and developer are new. This condition corrects itself after about 100 pages.
- The transfer belt is not fully engaged with the print drum.
- Replace the HVPS.
  - Feel the page for gritty carrier. Loose carrier on the page indicates a poor connection to the print drum charging grid.
  - Check the print drum connectors. Pull the spring contacts up to within 1 mm (0.039 in) of the top of the plastic housing.
- If the problem persists, replace the print drum.

Banding (large)

Banding can be caused by old maintenance units and by worn or damaged contaminated gears.

- Check the age of the maintenance units. Replace any that have exceeded their maximum life.
- Clean the transfer belt gears and the main motor gears.
- Use a halftone pattern such as the one provided in the ColorSmart selection in the printer driver. Banding is more apparent in some halftone patterns than in others.

CAUTION

Reinstalling the drum and closing the top cover without the corona cleaning tool fully seated to the right can damage the drum gear and cause banding.

Banding (medium)

Medium period banding is caused by developer sleeve runout.

- Check for slipping of the developer drive clutch in the developer drive assembly.

CAUTION

Reinstalling the drum and closing the top cover without the corona cleaning tool fully seated to the right can damage the drum gear and cause banding.

Banding (small)

Small period banding could be caused by gear noise in the main drive gears or in the spring-loaded gear.

- Clean the main drive gears and the spring-loaded pinion.
- If the problem persists after performing these procedures, change halftone patterns in the graphic.

Note

Medium and small period banding is more pronounced in process colors.

CAUTION

Reinstalling the drum and closing the top cover without the corona cleaning tool fully seated to the right will damage the drum gear and cause banding.

Black or dark brown/orange page

Totally black (or brown/orange pages in color applications) can result from the failure of the print drum charging system. If the page is not totally black, or the image clears up in a few pages, the print drum charging system could be shorting intermittently. The HVPS could also be failing. The page could be streaked with color, with the text readable through the color.

- Check that the print drum does not have toner accumulated under the housing. Carefully clean the housing if necessary. (Use the cloth provided in the collection kit.)
- Check that the transfer assembly is clean, with no areas contaminated to the point of shorting. Carefully clean the transfer assembly area if necessary.
- Run at least 10 pages of the self-test. If the defect persists, replace the print drum.
- Check the HVPS connections. Ensure that they are clean and in good repair. Stretch the high-voltage spring contacts to within 1 millimeter from the top of the plastic housing.

- Loose carrier on the page indicates a poor ground connection on the print drum high-voltage circuit. Clean the printer and reinstall the print drum. If the carryout persists, replace the print drum.
- Check the connectors between the formatter and control board for bent or misaligned pins.

Black/brown/orange bands

Black, brown, and/or orange stripes (horizontally or vertically) across the page are caused by light leaking into the printer and onto the print drum. Check the covers to make sure they fit properly. Generally the print drum will recover from exposure to room light, but the useful life of the print drum could be reduced. This defect is usually graduated along the page, with no clear starting or stopping point.

- If the brown/orange defect is not limited to a definite horizontal stripe, it could be necessary to replace the print drum. Print drum failure is also characterized by a black page.

CAUTION

Ambient room light can permanently damage the print drum. Store the print drum in total darkness to protect the photosensitive coating.

Note

This can indicate a high-voltage power supply problem. Check the HVPS.

Blank or partially blank page

Partially blank pages can result when the developer spacing rollers do not seat firmly against the print drum. When the top cover is closed, the load springs press the developer sleeves against the print drum. If this spacing is incorrect, less toner is attracted to the print drum, resulting in faint print. Check that the developers move freely (front to back) in the developer housing.

- Check that the cam timing is correct (see page 6-38 in the printer service manual). If the gear train has not been disassembled, check that none of the gears are broken, causing the timing to change.
- Check the print drum drive gear engagement. Listen for the sound of slipping (grinding) gears. Inspect the print drum drive gears for signs of wear. See the drum rotation functional test shown in the service manual. Replace the print drum and the drive gears if necessary.
- Check for 18.5 and 18.6 Reinsert developer errors. These errors indicate that the developer is not rotating.
- If the page is completely blank, the transfer cam solenoid could be stuck or broken. In this case, the image will not be transferred to the media. Use the service mode test address (53) to test the transfer cam solenoid.
- In addition, watch for the following:
  - Ensure that the media meets HP specifications.
  - Check for media multifeeds. Use the continuous self-test to prove that the printer feeds paper reliably. Rough media or light media could multifeed, resulting in blank pages.
  - Check for host communication problems or problems in network configuration.
  - Check banner pages and form feed commands in the software.
  - Make sure that the number of lines per page is correct. Too many lines per page result in creeping text. In this condition, each successive page begins its print further down the page. Part of each page will be blank.
  - A laser scanner failure has occurred. (This will have an associated message.)
  - A high-voltage failure has occurred.

Sequence of blank page tests

To troubleshoot blank pages, perform the following steps:

1 Run a half self-test as shown in Chapter 3. If the image is developed on the print drum, the laser scanner and developer systems are working. Check the following:

- The transfer assembly is functional.
- The cam timing is correct.
- The HVPS is operational.

2 If no image is present, refer to the high-voltage checks section for information on troubleshooting developer high-voltage failures. Also check that:

- The print drum rotates correctly.
- 18.5 or 18.6 errors have not occurred.
- The developer spacers are free.

3 With the Service Mode (test address 53), check that the transfer assembly cam solenoid is working.

- If the image is developed on the print drum and the output is blurry or faded, the transfer corona voltage could be missing. Replace the HVPS followed by the transfer assembly if necessary.

Cleaning blade failure

Cleaning blade failures are characterized by light smears in the horizontal axis of the page. This failure is more pronounced on toner-filled and multicolor pages.

- Replace the print drum.

(See also “Smeared print”)

Dark yellow print

This defect could be caused by black toner being deposited on yellow areas. Black developers that are used past their maximum life could contaminate color developers.

- Check that the printer is kept within the environmental specifications described in Chapter 2 of the service manual.
- Print a self-test page to check that the humidity is within the specifications listed in Chapter 2 of the service manual. If possible, verify the humidity sensor reading. (See also the “Humidity Sensor Test” in Chapter 7 of the service manual.)
  - Replace the humidity sensor (located on the toner sensor board) if necessary.
- Check the developer age as shown on the self-test page. Change the developers, if necessary.
- Print a solid yellow page, followed by a page with black and yellow print.
  - If the problem appears on the second page, perform the toner concentration test for yellow listed under 54.3 Toner concentration error in Chapter 1. If the value is within range, replace the black developer. Then run at least 10 pages of solid yellow.

Note

If dark yellow print occurs on transparencies only, see “Transparency defects” later in this chapter.

Faint print

- Manually check the toner hoppers to see if any are empty. An empty toner hopper without the message to add toner indicates a failed toner hopper sensor.
  - Replace the sensor and add toner.
- Check the toner supply augers for correct operation.
  - Remove the toner hopper cover.
  - Inspect the augers from the hopper to the developers for kinks or bulges.
  - Rotate the large gear on the side of each hopper one turn, checking to make sure the auger inside the tube turns.
  - Remove the developers and check the ends of each auger tube for clogged toner. Remove any toner that could be packed into the end of the tube.
  - Check the toner hopper select mechanism and the toner supply mechanism for proper operation by running multiple demo pages while watching these mechanisms. If either mechanism fails to operate, see “18.5 and 18.6 Mechanism Alignment Checks” on page 7-34 of the service manual.
- The print drum might not be fully discharged during the writing process due to accumulated toner on the laser scanner assembly window. This reduces the laser power that discharges the print drum, causing faint print in all colors.
  - Lower the print drum and clean the optics window with the tool provided.
- Poor transfer causes faint print in irregular areas of the output.
  - Remove the transfer assembly. Ensure that the connections are clean and that nothing inhibits the transfer assembly from fully seating.
  - Perform the half self-test (described in Chapter 3) to determine whether the failure is associated with the transfer assembly.
  - If the image is fully developed on the drum, then the problem is shown to be in the transfer assembly.
- Replace the print drum.

Ghosting

Ghosting appears on the page as a latent image of previously printed material along with the text or graphic that was printed last. It also could look like a repetitive defect. This defect occurs when using a print drum past its maximum life. Consumable life information appears on the self-test page.

- If the print drum is within its maximum life, thoroughly clean the printer. If it is past its maximum life, replace the print drum.

Check that the user is not printing the same pattern repeatedly. Repeat patterns shorten the life of the print drum.

Horizontal lines (all colors)

- Check for toner dust on the laser scanner window.
  - Clean the laser scanner window as shown in the service manual.
- Check for charging corona/grid contamination. Sharp, crooked, or random horizontal lines indicate contamination.
  - Clean the print drum corona wire. This applies only to new style (purple-coded) drum.
- Check for debris in the fusing assembly.
- Check for contamination of the transfer assembly.
  - Clean the transfer corona wire.
  - Replace the transfer assembly.

Horizontal white lines (one color)

Note

When the lines run horizontally (across the page), they are banding; when the lines vertically (down the page), they are streaking.

Horizontal white lines on black and white output occur when relatively large foreign particles become stuck between the black developer sleeve and the metering rod. The foreign matter prevents toner from coating the developer roller. Remove the developer to see if it has a clean stripe where the foreign matter is wedged. To remedy this problem:

1. Remove the developer from the printer.
2. Locate the drive gear for the failing developer and turn the gear counterclockwise as you face it. If the failure persists, replace the developer.

Horizontal lines on colored media occur for the same reason as described above. The lines occur in primary and process color. For example, a particle in the magenta developer will create a white (or light) line in magenta areas. In colors that use magenta, the magenta will be missing, leaving a yellow line in a red area or a cyan line in what should be a blue area. The Developer defect colors table, below, shows the result of a defect in each of the four developers.

Developer defect colors

#/Developer		Black	Yellow	Magenta	Cyan	Red	Green	Blue
1	Black	X						
2	Yellow		X			X	X	
3	Magenta			X		X		X
4	Cyan				X		X	X

Image skew

The specification for image skew is less than 1.5 mm (0.059 in) over a 250 mm (9.843 in) span. Image skew could be caused by burrs on the paper registration plate or by paper not feeding from the paper tray correctly.

- Check that media does not stick together at the edges. Ensure that the paper meets HP media specifications.
- Ensure that the paper tray side adjustment lever is adjusted properly against the edge of the media.
- Check the paper stack tabs in the paper tray.
- Carefully examine the printed output for signs of nicking or folding. These marks could indicate problems elsewhere in the print path.
  - Remove the cover and examine the guides. Ensure that the cover is properly installed.
- Check the paper pickup rollers for signs of wear, such as glazing and cracking.
  - Replace the pickup rollers, if necessary.
- Check the paper tray transport roller for wear, proper spring position, and even pressure from side-to-side.

Note

Check both sets of transport rollers. One set is accessed from the lower back cover. The other is next to the overhead transparency sensor and registration plate.

- Check the registration plate for burrs.
  - Ensure that the registration plate is not bent or damaged. Ensure that it moves freely up and down. Replace the registration plate if any of these defects are found.

Improperly sized image (PostScript only)

Improperly sized images can be caused by defective paper tray microswitches. The paper tray microswitches tell the formatter what size media is installed. This information is used to format the print image to the installed paper size. If the paper tray microswitches are defective, the PostScript image will be formatted incorrectly.

Paper tray size functional test

Use the status and test feature of the Service Mode to check the function of the paper tray size switches. See the status and test address table in Chapter 3 for information on this test. To test the paper tray switches:

- Power cycle the printer and enter the Service Mode as shown in Chapter 3.
- Select the status and test mode function of the Service Mode.
- Enter the paper-size switch test code (15 for tray, 16 for the RFU) and press **Enter**.
- The logic state of the switches is displayed on the control panel.
- Remove the paper tray and depress each of the paper tray size switches. The control panel display should change as shown in the status and test address table in Chapter 3.

Check the paper tray size indicator tabs on the paper tray.

Incorrect registration (late or early print)

Incorrect registration is characterized by the image being offset from the left side of the page.

- Check for problems in the paper registration mechanisms.
- Check the cam timing. Refer to Chapter 6 in the service manual for information on cam timing.
- If the registration error is small and consistent on every page, small changes in registration can be made with the `REGIST ADJUST` feature of the Service Mode. See Chapter 3 for information on `REGIST ADJUST`.

Note

The REGIST ADJUST function should not be used until all other causes are eliminated and the offset is consistent on every page.

Incorrect registration

Incorrect registration is characterized by the entire image being offset from the leading edge of the page. This will be the left edge for letter, A4, and executive media. It will be the top of the page for legal, tabloid, and A3. Before troubleshooting incorrect registration as an engine problem, check the margins and image placement in the software application. If the same file consistently prints in the wrong location on the page, suspect a software problem. If the file is a PostScript file, see Improperly sized image earlier in this chapter.

- If the image is late on the page, the paper is arriving at the drum/transfer interface too soon. Troubleshoot this problem as follows:
  - Inspect the registration plate for burrs.
  - Ensure that the registration plate moves freely throughout its range of motion. If the registration plate sticks anywhere in its motion, check the solenoid linkage. Replace the solenoid and linkage if necessary.
  - Check that the registration plate moves all the way up. If it moves only part way up, the paper can cross the registration plate too soon. When the solenoid plunger is released from the solenoid, it should touch the rubber stopper behind the linkage and the registration plate will be in the uppermost position.
- If the incorrect registration is very small and is off by the same amount on each page, small adjustments are possible. Enter the Register adjust mode of the service mode (as described in Chapter 3) and proceed as follows:
  - Enter the desired register adjust address. See the “Register adjust addresses” table on page 91. Addresses 74 and 76 control the leading edge margin for each of the paper sources. The allowable range for values is 35 to 65. For each one-count change, the leading edge of the print moves 0.74 mm (0.029 in) relative to the media. Higher values move the image closer to the leading edge of the media.

  - Address 75, 77, and 79 control the start of the laser scan. The allowable range of values is 01 to 99. For each increment of one, the start of the laser scan moves 0.088 mm relative to the media (the scan starts at the left side of the printer). Higher values move the print closer to the top of a letter, A4, or executive page. For legal, tabloid, or A3 size paper, the print starts closer to the right.

Leading or trailing edge smear

Toner accumulation on the paper charging brush causes the leading and trailing edge of the printed output to be smeared with loose toner.

- Clean the printer (including the paper-charging brush).
- If the media size has been changed (such as from legal or executive to letter), print 5 to 10 pages to clear the smearing.
- If a paper jam has occurred recently, or the printer had a multifeed, print 5 to 10 pages to clear the smearing.
- Replace the paper-charging brush if this defect persists. Print 20 to 30 self-test pages to verify the repair.

Mottled process colors (poor transfer)

- Check that the media meets HP specifications.
- Printing in low humidity also causes poor transfer.
  - Perform the humidity sensor tests.
- Clean the transfer corona wire and reseat the transfer assembly. Oxide buildup on the transfer corona wire adversely affects how the printer transfers the developed image to the page.
- Select ColorSmart from the driver menu. Business blue, included in the ColorSmart menu, has more constant transfer characteristics.
- Change halftone patterns. Some halftone patterns make poor transfer more visible.
- Replace the transfer assembly if necessary.

Poor fusing

Poor fusing is characterized by loose toner on the printed page. Unfused or poorly fused toner can be easily wiped off the page. This is usually most obvious on the trailing edge (the right edge) of the page.

- Check that the media is within the weight and smoothness specifications listed in the *HP LaserJet Printer Family Paper Specification Guide.*
- Check that the printer does not multifeed. If more than one sheet enters the fuser, the toner on the top sheet might not fuse. (See the multifeed information in Chapter 4.)

(See also Background scatter.)

Ring marks

This defect appears as small rings or circles on the printed page. Ring marks can be caused by small particles in the developer.

- Run the demo page for 20 to 30 pages to isolate the problem to a specific color.
  - Replace the developer that exhibits the problem.
- Check the environment for sources of contamination. For example, printing in an area that is subject to fine metal particulates, metal filings, or metallic debris will cause ring marks.
- Sudden rises in ring mark frequency can indicate wear in a component. Keep this in mind when troubleshooting ring mark defects in printers that have no history of ring marks.
- Check the age of the developers and replace any that are past their maximum life.

Smeared print

(See also “Cleaning blade failure” and “Leading or trailing edge smear.”)

- Check that the paper path is clean.
  - Check to see if the media is being bent during paper pick. If the media retains the bend as it enters the fuser, the print in the area of the bend can smear.
  - Ensure that the media is correctly loaded in the paper tray. If the defect persists, turn the paper stack over and end-to-end.
  - Try another media type. Check that the media meets HP specifications.
- Check that the fuser does not have toner buildup on the inputs. Clean any loose toner accumulated around the fuser.
- Inspect the pretransfer brush. Replace it if there is any toner buildup.
- Severely smeared print can indicate that media is stuck under the cleaning blade inside the print drum. If this is the case, the drum wrap sensor is defective and the surface of the print drum could be damaged. Run the half self-test. If the print is smeared on the drum surface, replace the drum.

Speckled print

Speckled print (or toner popping) can be caused by excess moisture in the print media. Verify the cause of this defect by printing with a properly stored ream of paper.

- Check that the media is stored in a dry area and is not opened until it is ready to be used.
- Be sure that the printer is not in a humid area.
- If the defect persists, run a self-test page and check the humidity sensor reading.

Stray toner

This defect is differentiated from repetitive defects by:

- random occurrences
- raised pieces of irregularly shaped, poorly fused toner on the page that can sometimes be removed by wiping or with a fingernail

Stray toner or irregular raised spots on the page occurs when excess toner accumulates around the fuser and is eventually deposited on the media during fusing.

- Check for toner accumulation around the fusing assembly.
- Clean the assembly if necessary.
- Check the paper weight and smoothness. Rough paper can stick together causing multifeeds. The extra thickness of multiple sheets of paper can cause poor fusing which deposits toner on the fuser rollers. This toner comes off on later pages as stray toner. Poor fusing can also occur when printing on heavy paper.
- Check the coating roller seating.
  - Clean any accumulated toner off the pad and the corresponding position on the fuser pressure roller.
- Run a self-test and check the age of the coating roller.
  - Replace the coating roller if necessary.
- Reseat the cleaning roller and the coating roller.
- Check the error log for fusing errors. If the fuser does not heat properly, the unfused toner accumulates around the fuser and is deposited on the page as stray toner.

CAUTION

If many multifeeds have occurred or the printer consistently prints on heavy paper (over 90 g/m^2 or 24 lbs), it could be necessary to replace the fuser.

Transparency defects

Overhead transparencies (OHT) can display any of the image quality defects shown in the colored sample pages. In addition, because transparencies are pliable while in the print path, they are subject to being marked by the media-handling components.

- If transparencies show lines and creases in the printed sheet, compare the defect against the template to help isolate the cause to a specific component.
- If horizontal streaks appear on the output (when viewed in portrait orientation), run a self-test to check the age of the coating roller.
  - Replace if necessary.
- Check that the transparencies meet the specifications listed in the *HP Paper Specification Guide*. Also check that they are the supported HP part number (C2934A for letter and C2936A for A4).
- For dull transparencies, contact your local response center.
- Dark transparency output can be caused by a defective transparency sensor (PS5). Use the Service mode status and test (address 59) to test the OHT sensor. If this sensor is defective, the printer will not recognize transparencies and will print at the faster paper speed.
- Reprint transparencies if they have spots or smudges. Be careful not to touch the surface of the media. Skin oils can contaminate transparencies, causing spots and smudges.
- Small random dark areas on the trailing edge of solid fill pages can be caused by transparencies sticking together in the face-up bin.
  - Try printing the job in smaller batches.

Note

Allow transparencies to cool at least 30 seconds before handling them.

Transparencies created on the printer cannot be used on reflective-type (portable) transparency projectors.

Causes of transparency curl

- Ensure that the face-up bin is pulled completely out and is tilted up. If the bin is pulled only partially out, the transparencies are subject to curling.
- If the curl of black-only transparencies printed to the face-down bin is unacceptable, these transparencies can be printed to the face-up bin by changing the media output selection from the software or from the control panel.

Repetitive defects on transparencies

Overhead transparencies that have repetitive defects spaced about 94 mm (3.7 in) apart indicate a defect on the upper fuser roller.

1. Turn the power off and unplug the printer; allow 30 minutes for the fuser to cool and then remove the fuser.
2. Remove the leveling roller and the oil pad.
3. Turn the fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges) replace the fusing assembly.

Note

Lengthwise wrinkles on the roller surface are normal.

Specific marks on page

Marks can appear at specific locations on transparencies as follows:

Upper registration roller marks. These marks always occur at the top of a landscape letter page. They appear only on transparencies, almost never on paper. This defect is caused as the registration rollers rotate on the media when it is pressed against the registration shutter. The friction and pressure of the rollers on the media leave lightly scuffed areas that transfer color differently.

- Roller marks can be helped by cleaning the rollers with a soft, alcohol-dampened cloth.
- Ensure that the registration rollers are not damaged or abraded. Replace if necessary.

- Check that the upper registration rollers have equal spring pressure on the right and left sides.
- If no problem is found with the rollers or springs and the marks are very light, take no further action. Changing the spring force will cause paper path errors, registration problems, and paper jams.

Second feed roller marks. These marks occur in the same location around the center of the page. They sometimes occur on the back of the page.

- Perform the checks listed in the previous list for upper registration roller marks.

Star wheel marks. Small dots or dashes sometimes appear in one or both of the locations shown on the print defect template. These defects occur when the trailing edge of the page touches the small spurs on the lower surface of the print drum housing. They are normally small and intermittent.

- Replacing maintenance units, such as the fuser or transfer assembly, sometimes increases the frequency of this defect.

Exit roller mark. These four lines on the back of the transparency can be eliminated by cleaning the four exit rollers with a damp cloth. The lines on the back of the transparencies are easily wiped away with a dry cloth.

Repetitive defects

Most repetitive defects are caused by imperfections in the print drum or fuser roller. Print drum defects occur in the same vertical position on the page, but might not appear on each consecutive page. Defects caused by print drum imperfections appear as black or white marks on the page.

- Run at least four consecutive test pages to determine if the defect repeats in the same vertical orientation.
- Inspect the print drum for damage. Replace the print drum if it is scratched or dented.
- Check to see if paper dust is adhering to the print drum. These defects usually appear as white marks in the dark printed areas of the page.

– Remove this dust with 70% isopropyl alcohol applied with the cloth supplied in the collection box kit. Try this *only* if the print defect is unacceptable and the only other alternative is replacing the print drum.

CAUTION

Do not expose the print drum to strong light, and be careful not to scratch or get fingerprints on the drum surface during cleaning. Do not blow on the print drum.

- Portions of the print drum could have been exposed to light. Light on sections of the print drum causes dark sections in the printed output. If the exposure was minimal, these defects can clear up over time. The life of the print drum is shortened by exposure to strong light.

Overhead transparencies that have repetitive defects spaced about 94 mm (3.7 in) apart indicate a defect on the upper fuser roller.

- Turn the printer off and allow 30 minutes for the fuser to cool. Then remove the fuser.
- Remove the cleaning roller and the coating roller.
- Turn the fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges), replace the fusing assembly.

Note

Lengthwise wrinkles on the roller surface are normal. Uniform lines and creases in transparencies can be caused by rollers or other print path components. Use the template provided in the “Overhead Transparency Defects” section of the service manual to isolate the defect to a specific print path component.

Repetitive defects caused by the transfer belt

Repetitive defects can also be caused by defects in the transfer belt.

- Remove the transfer assembly and inspect the entire belt surface. Use the transfer assembly gears to rotate the belt throughout its travel.

Wavy characters

Wavy characters are caused by scanner wobble. Mechanical instability in the scanner mechanism or the optics can cause wavy characters.

- Reprint the job to ensure that the problem persists.
- Replace the laser scanner assembly.

Yellow or black streaks

- Check the developers for contamination.
- Clean the optics window.
- Check for oxide buildups on the print drum charging corona wire.
- Clean the charging corona if a new style (purple-coded) drum is installed.
- Replace the print drum if this problem persists.
- The print drum has reached its maximum life. Replace the print drum.

(See also Horizontal lines.)

Repetitive image defect ruler

Use the ruler shown below to measure the approximate distances between repetitive image defects.

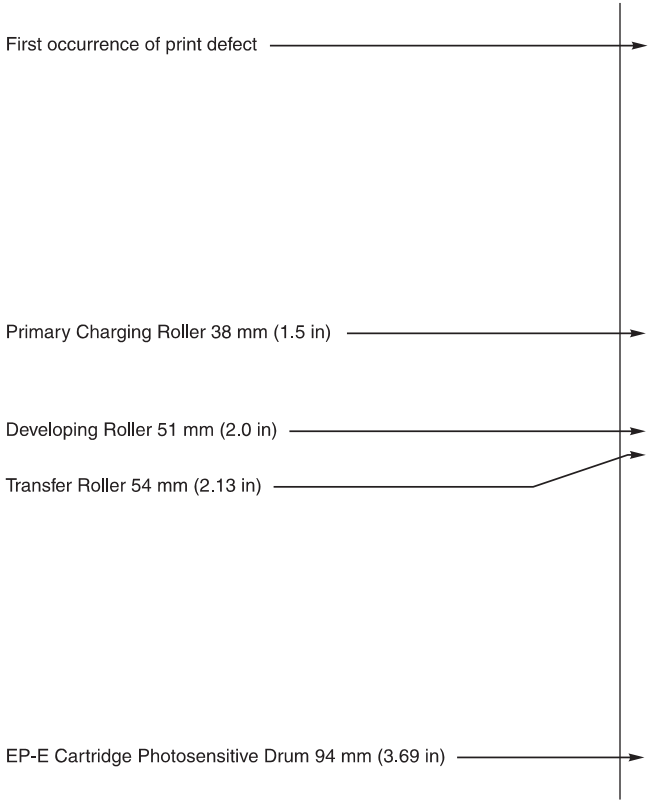
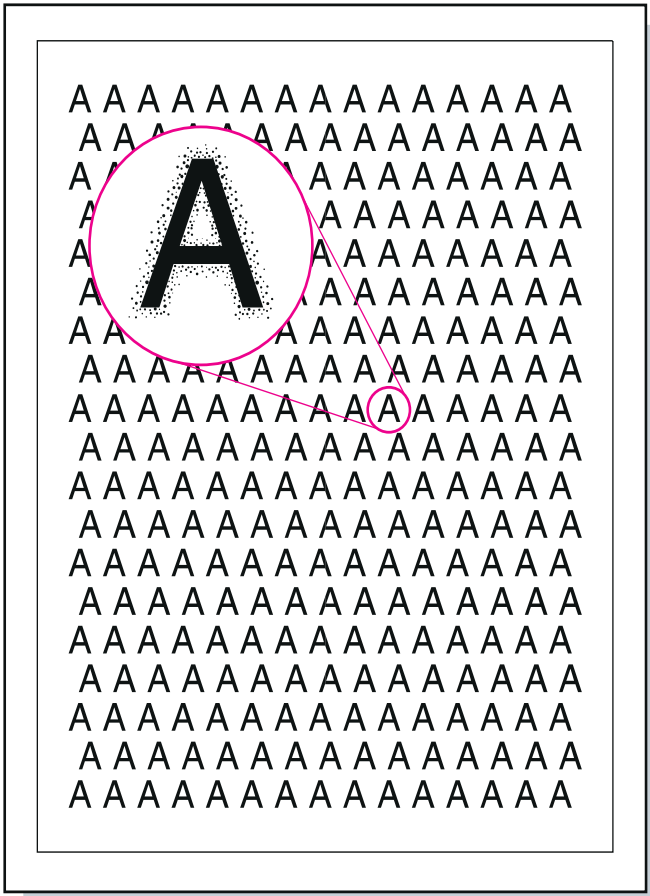
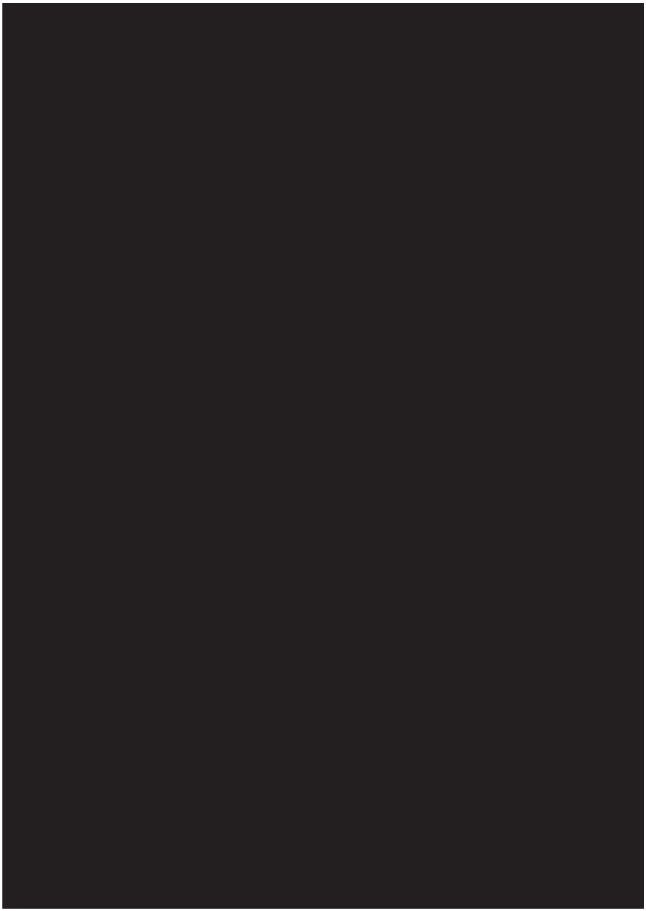

First occurrence of print defect
Primary Charging Roller 38 mm (1.5 in)
Developing Roller 51 mm (2.0 in)
Transfer Roller 54 mm (2.13 in)
EP-E Cartridge Photosensitive Drum 94 mm (3.69 in)

Image defects

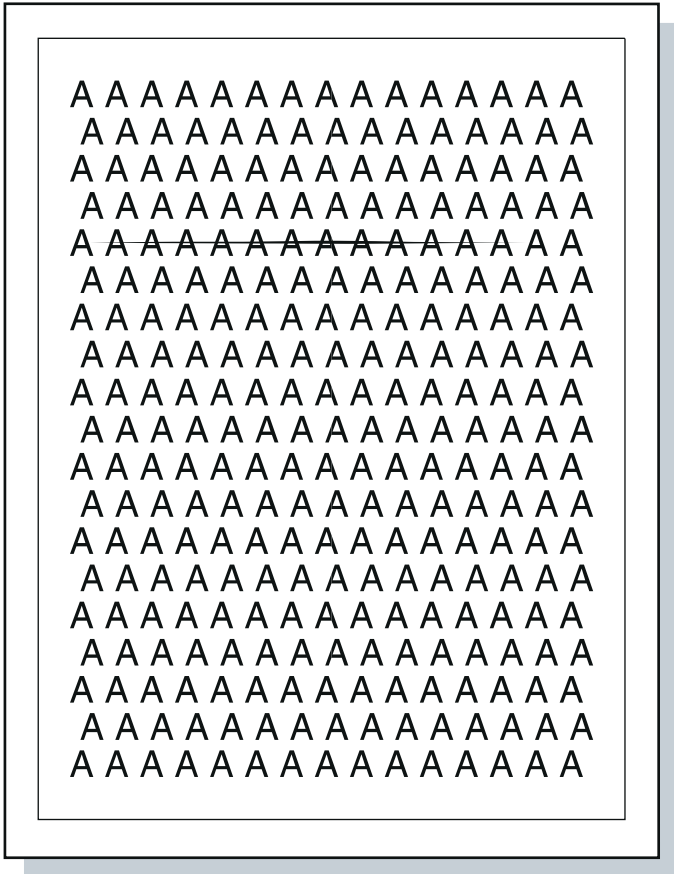


Background toner scatter ***(see page 150)***

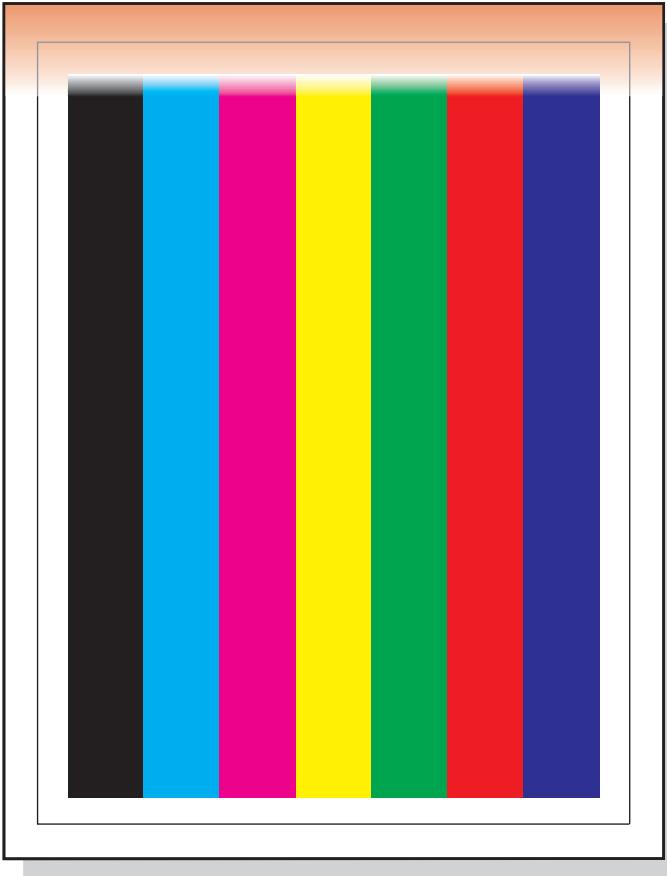
Banding-large, medium, or small ***(see page 151)***



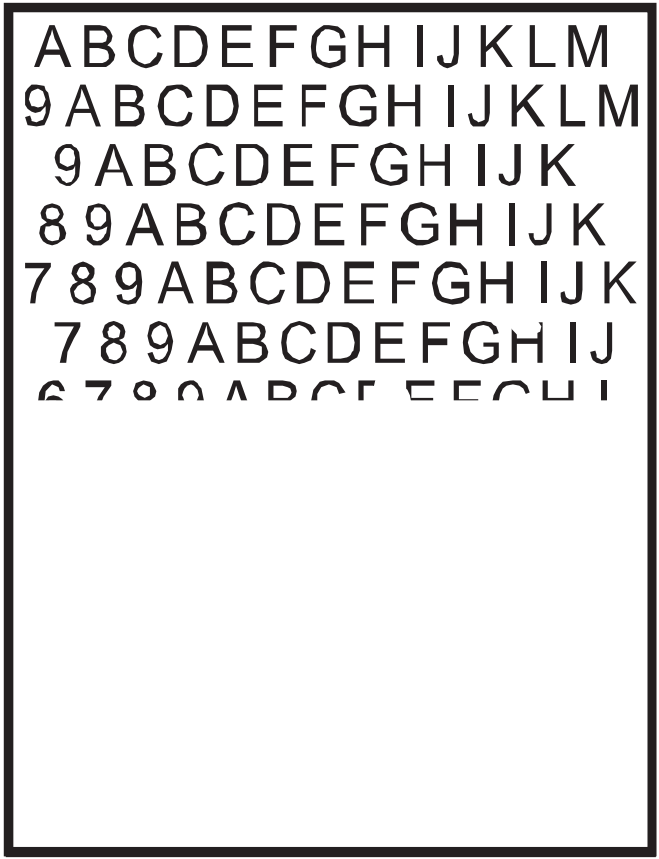
Black or dark brown-orange page ***(see page 152)***



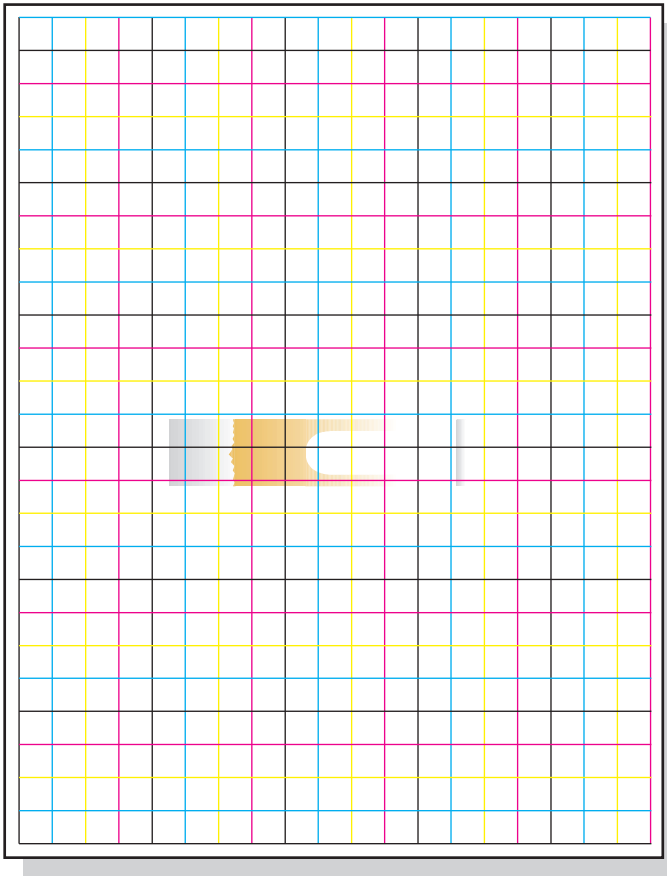
Black streaks ***(see page 171)***



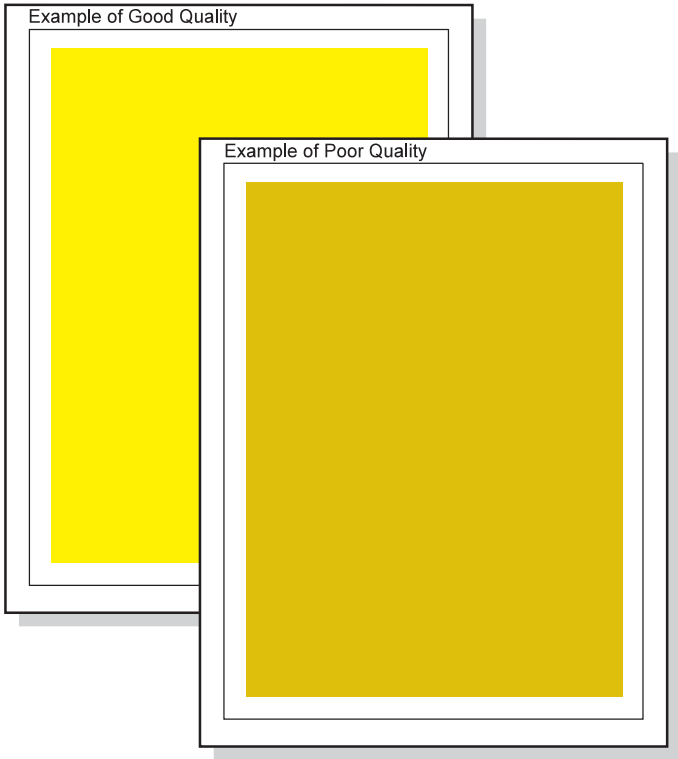
Black/brown/orange bands ***(see page 153)***



Blank or partially blank page ***(see page 154)***

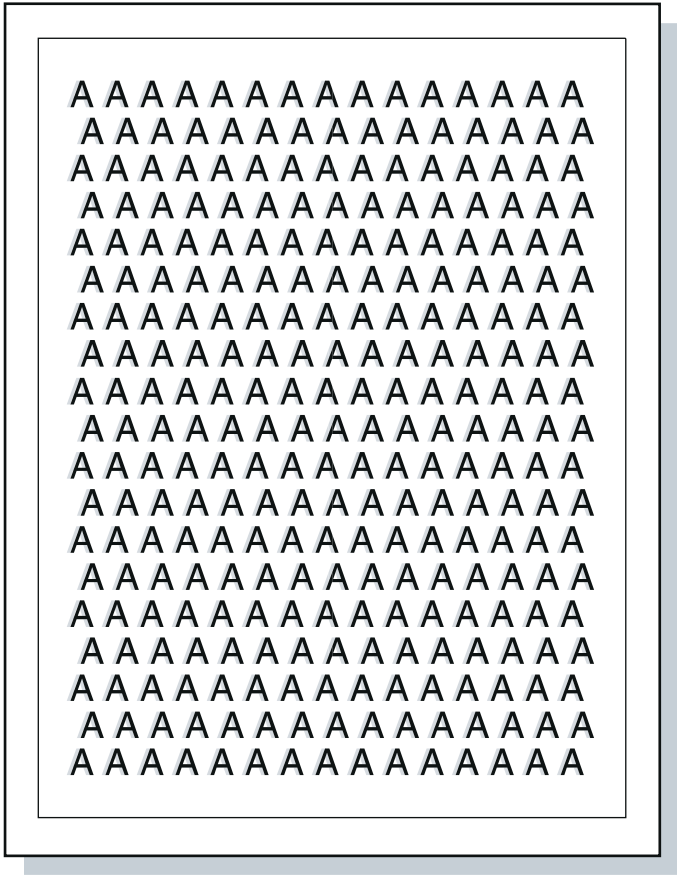


Cleaning blade failure ***(see page 156)***

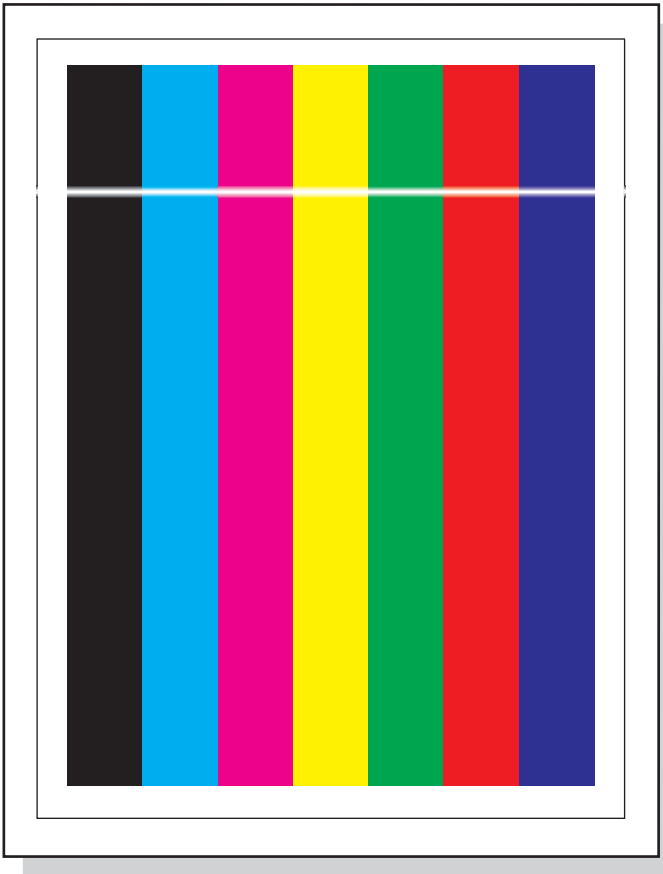


Dark yellow print ***(see page 156)***

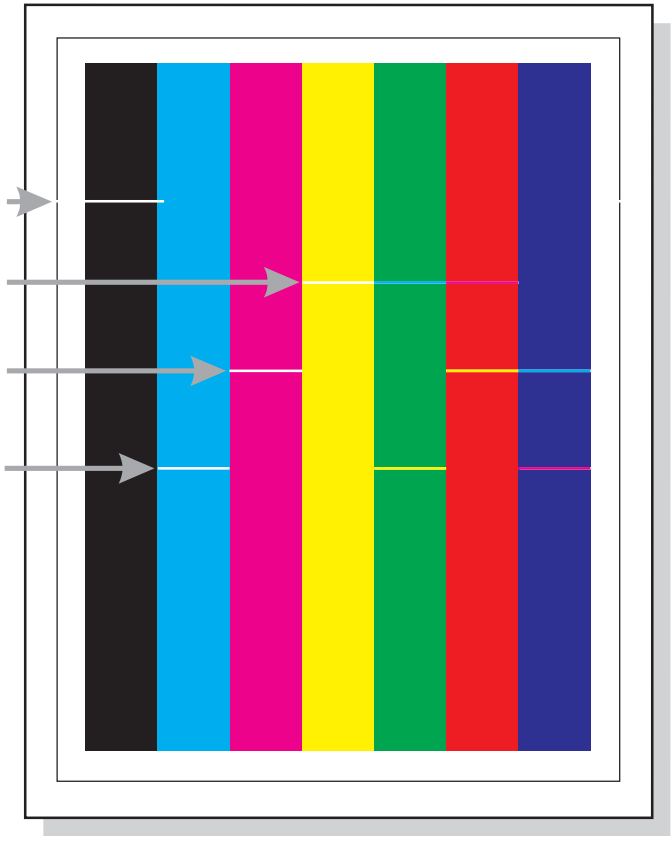
Faint print ***(see page 157)***



Ghosting ***(see page 158)***



Horizontal lines-all colors ***(see page 158)***



Horizontal lines-one color ***(see page 159)***

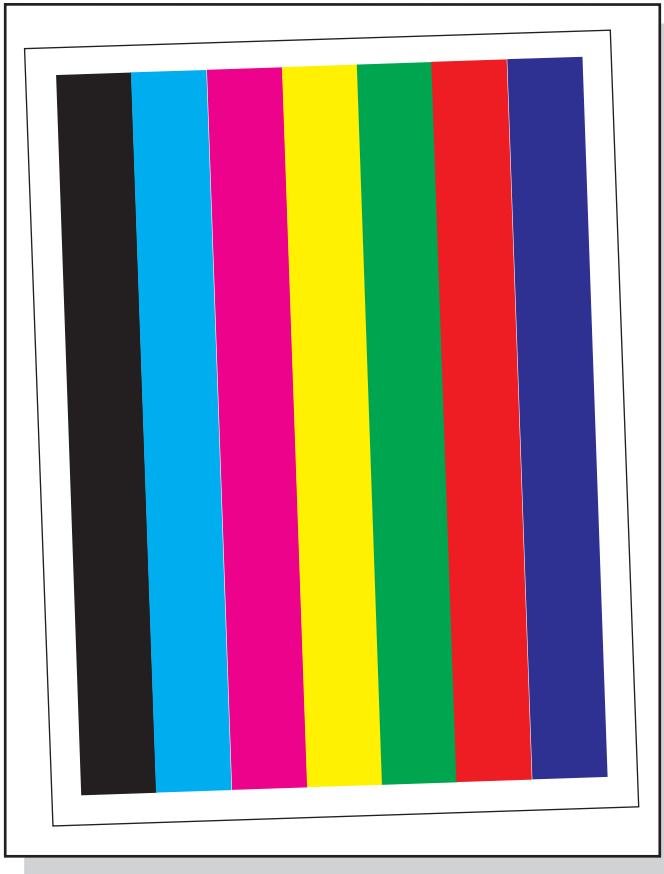
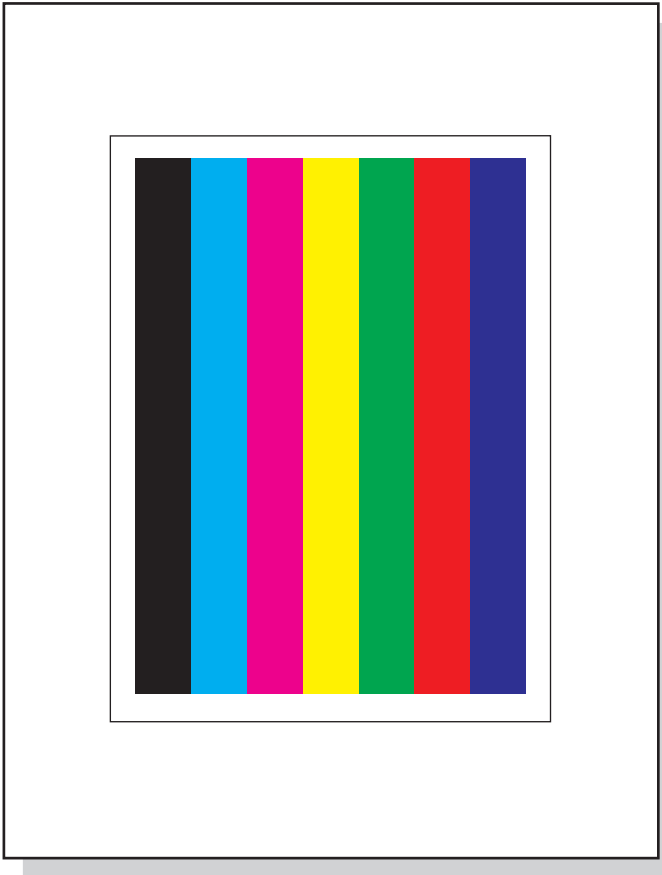
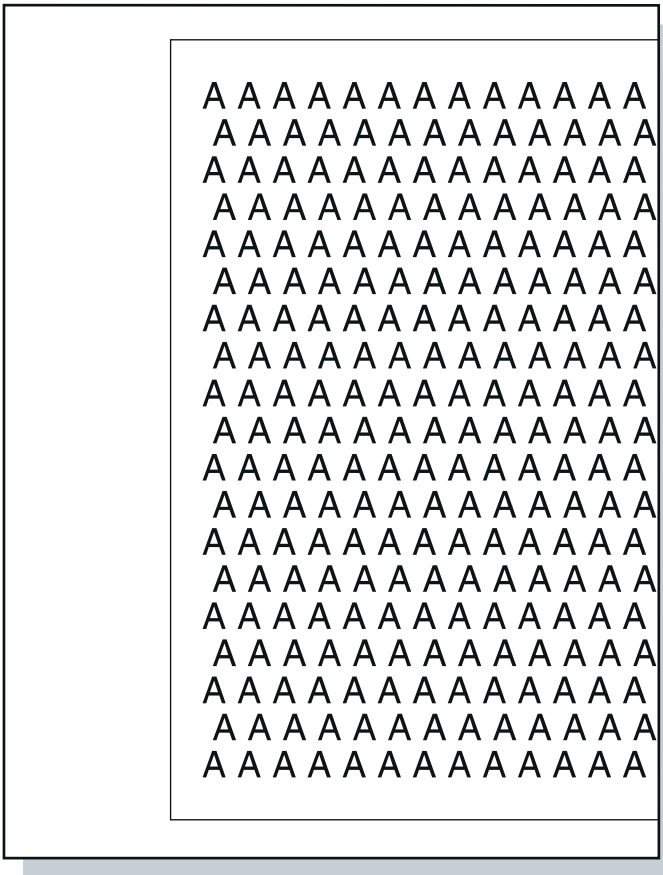


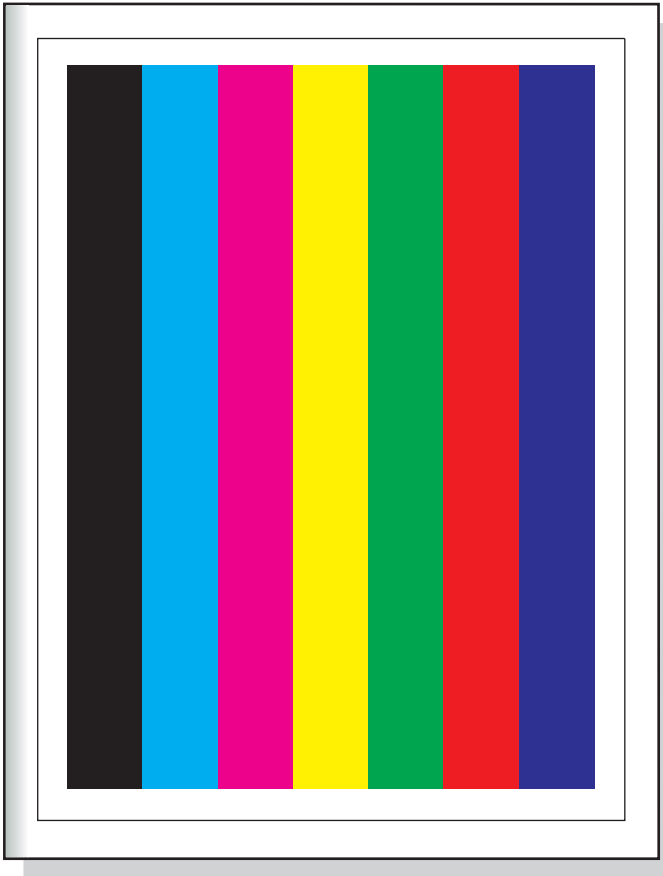
Image skew ***(see page 160)***



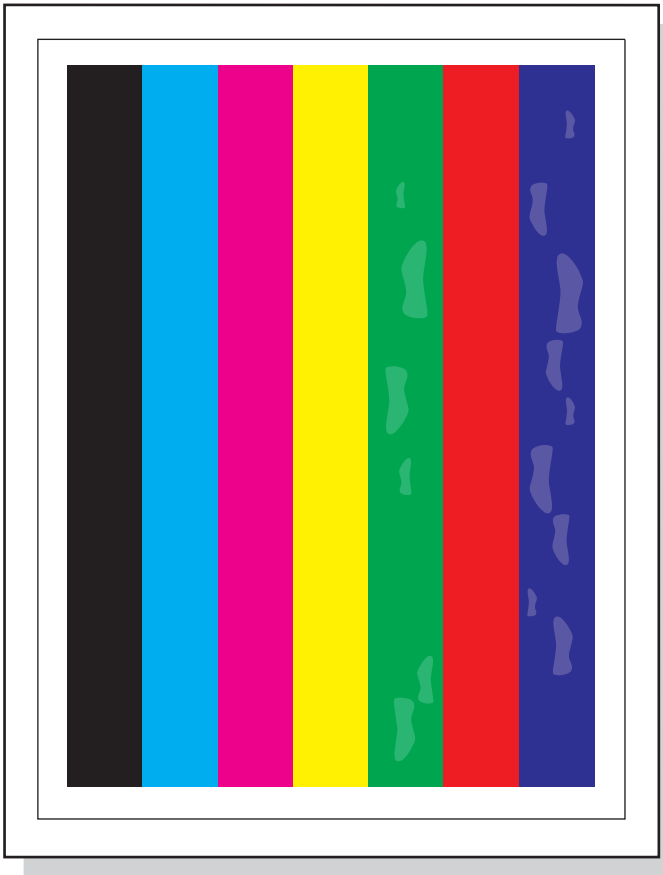
Improperly sized image ***(see page 161)***



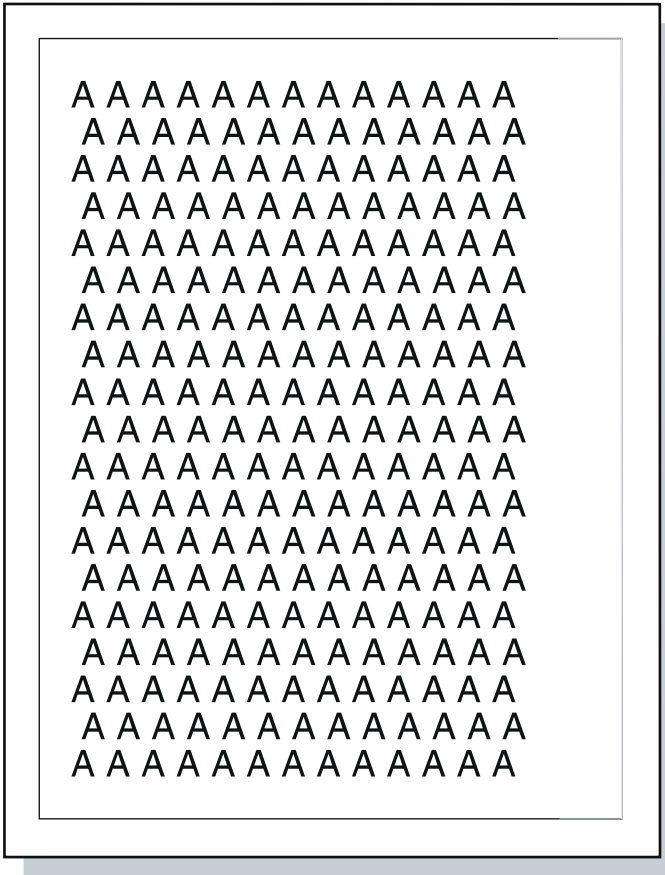
Incorrect registration ***(see page 162)***



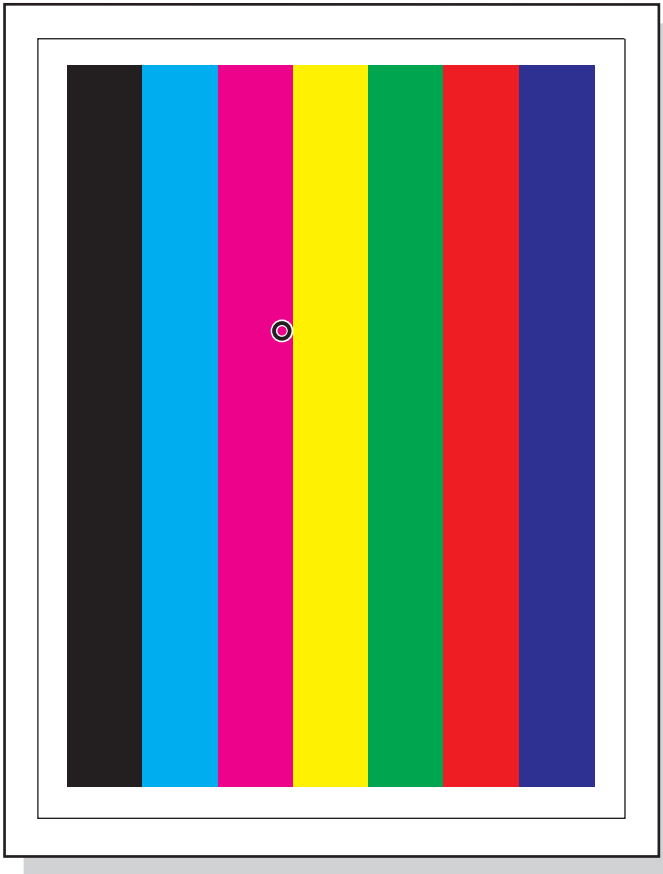
Leading/trailing edge smear ***(see page 163)***



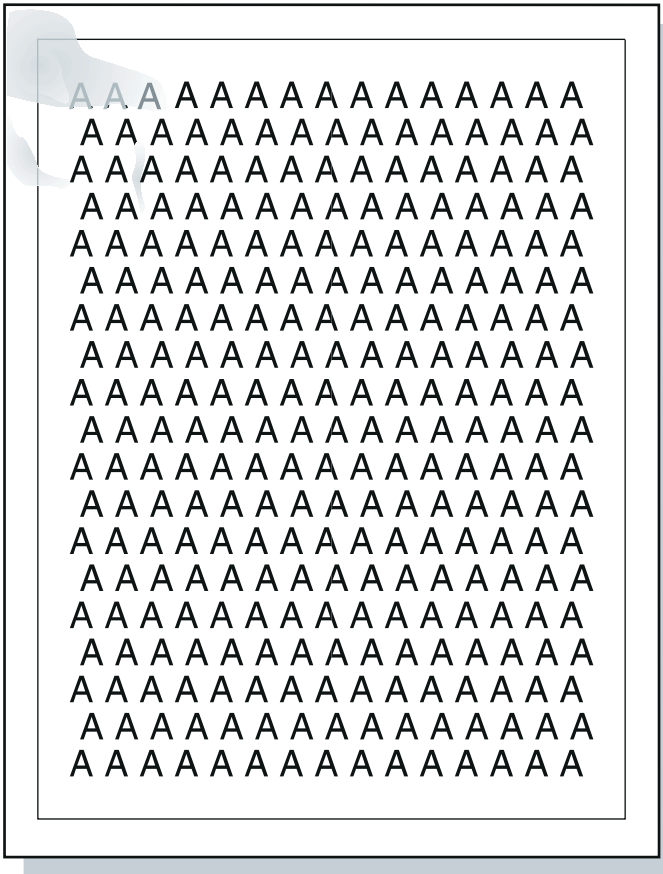
Mottled process colors-poor transfer ***(see page 163)***



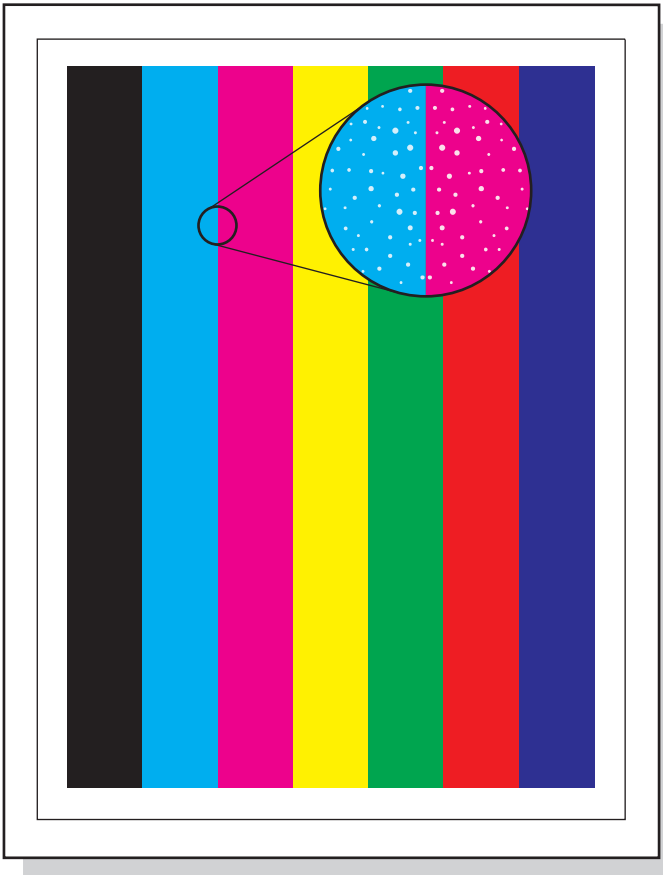
Poor fusing ***(see page 164)***



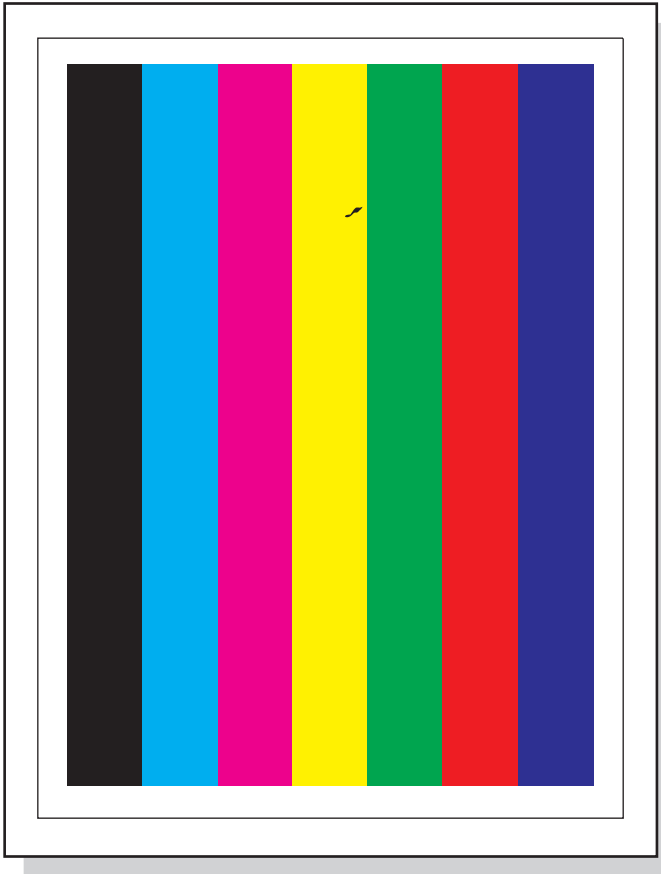
Ring marks ***(see page 164)***



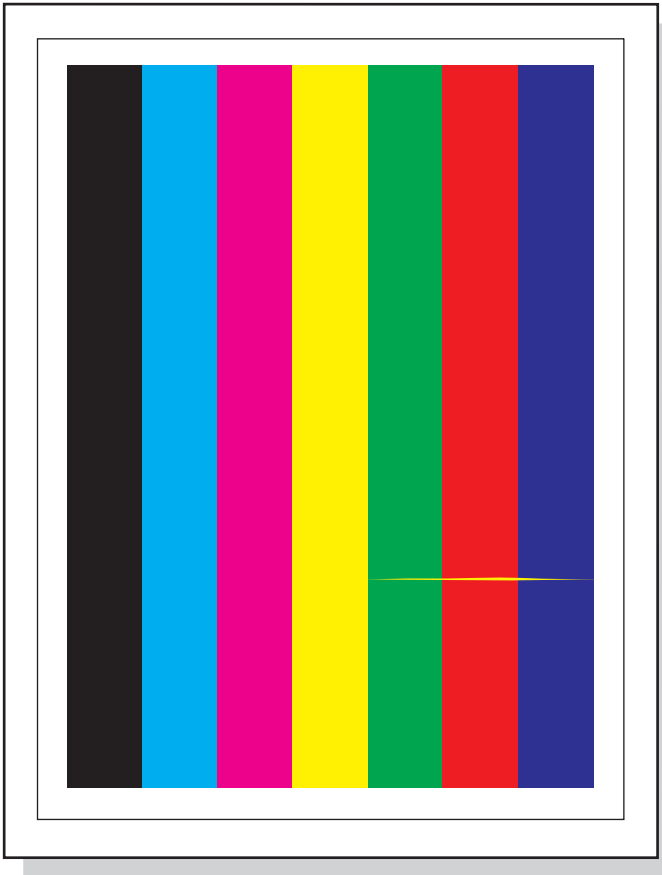
Smeared print ***(see page 165)***



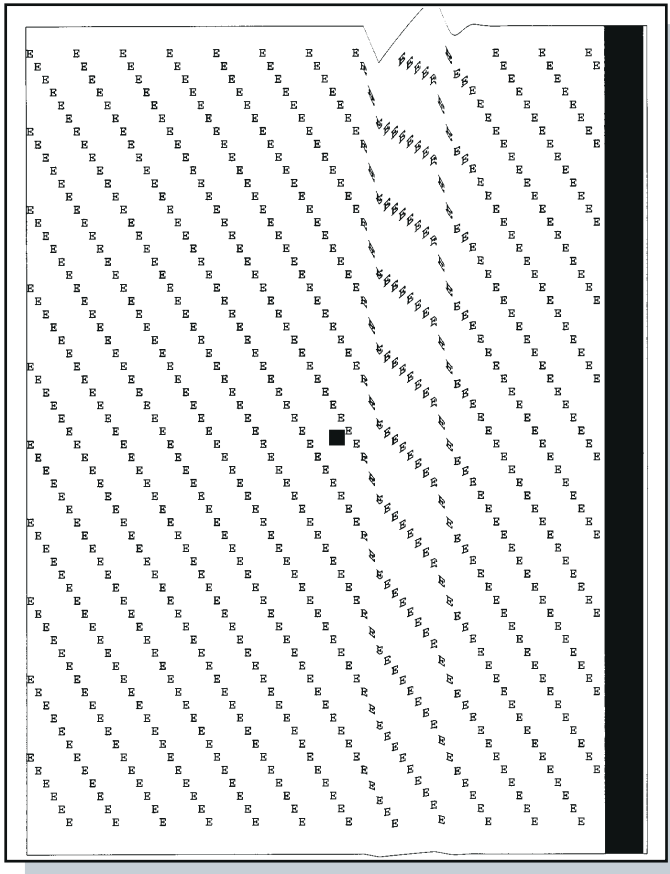
Speckled print ***(see page 165)***



Stray toner ***(see page 166)***



Streaks ***(see page 171)***



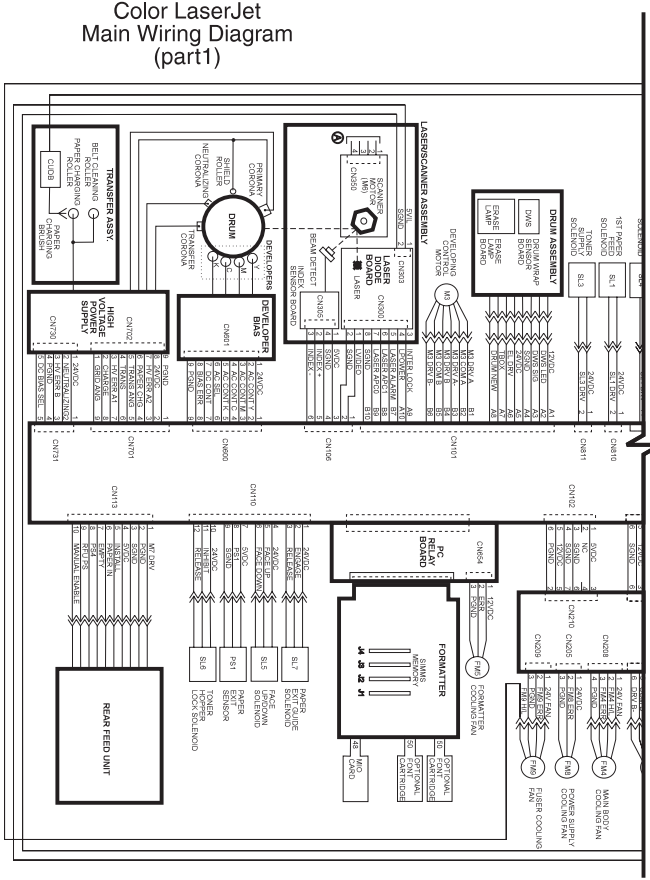
Wavy characters ***(see page 171)***

8 Wiring diagrams

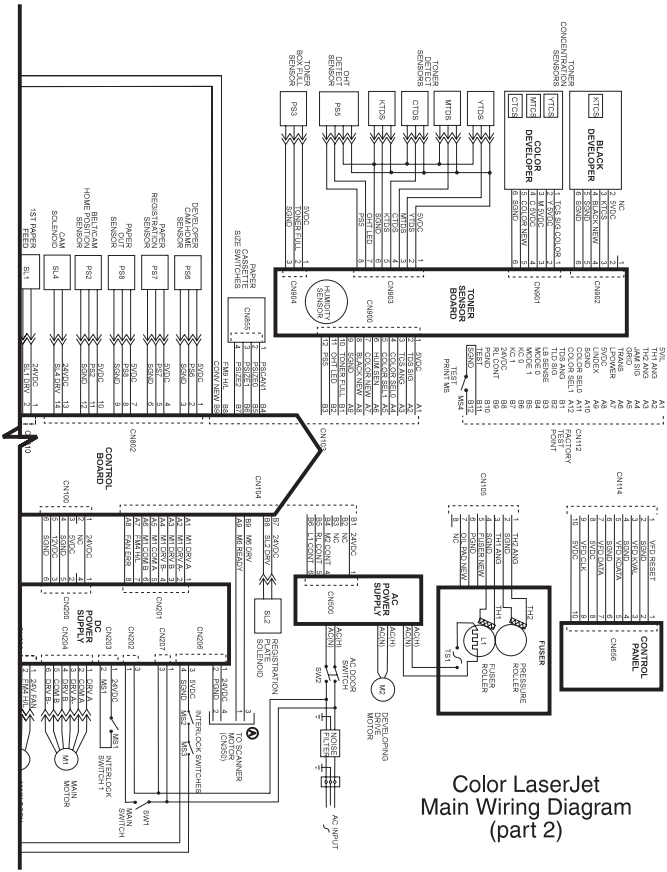
Overview

This chapter provides wiring diagrams and information on the control board fuses for the printers supported in this guide.

Wiring Diagrams

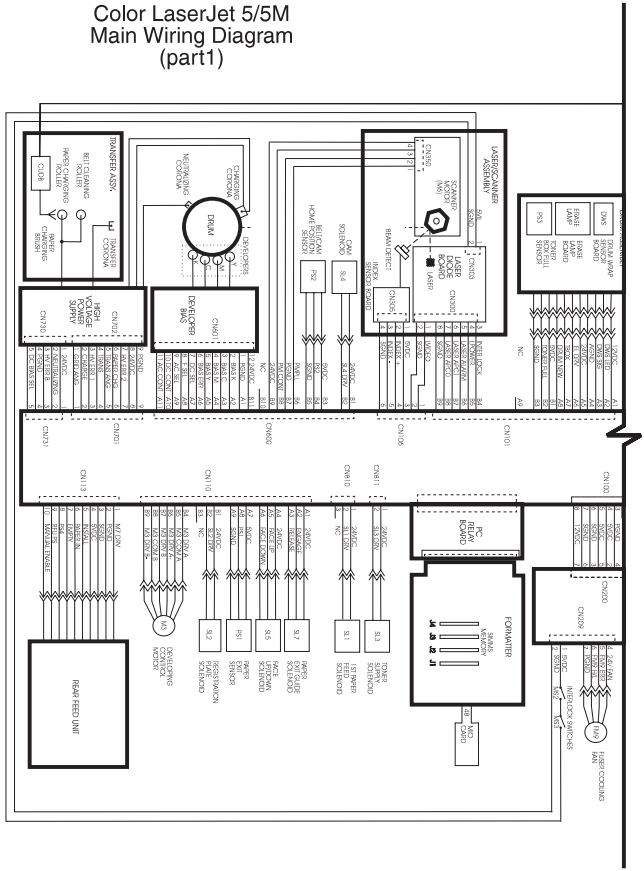


(Color LaserJet)

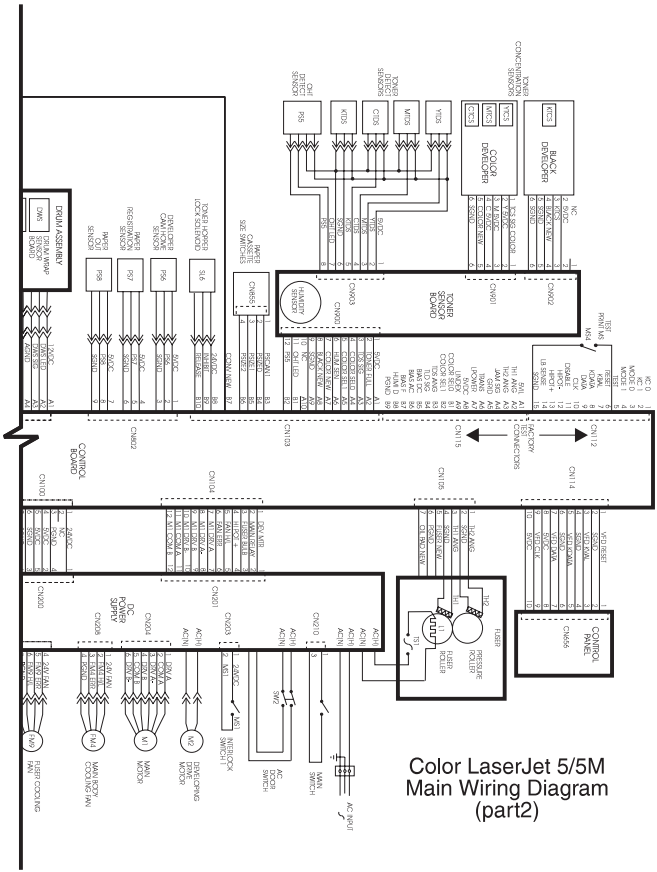


(Color LaserJet)

Color LaserJet 5/5M
Main Wiring Diagram
(part1)



(Color LaserJet 5/5M)



(Color LaserJet 5/5M)

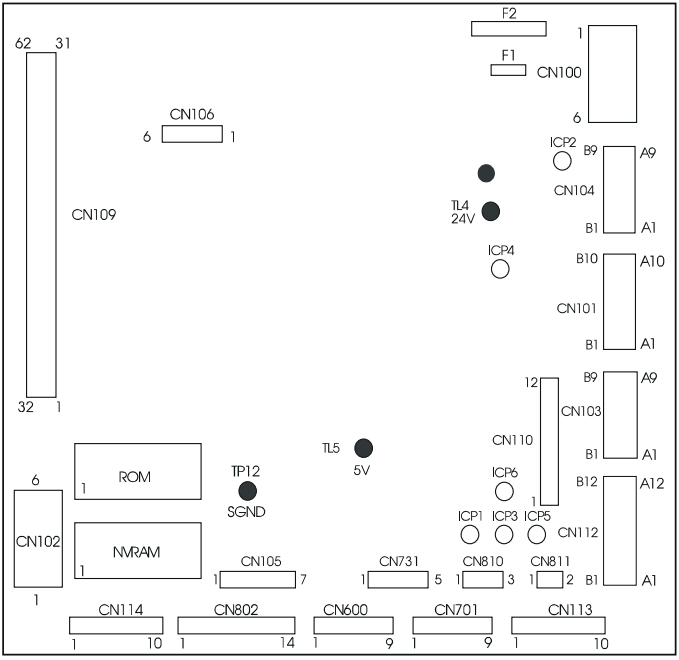
Control board fuses

The following table identifies the fuses on the control board for both the HP Color LaserJet printer and the HP Color LaserJet 5/5M printer. The table also shows what is in line with the fuse and the most likely failure if one is blown (open). Use an ohmmeter to check the status of the fuses. Since the fuses cannot be replaced individually, make sure that the cause of the blown fuse is identified and resolved before replacing the control board.

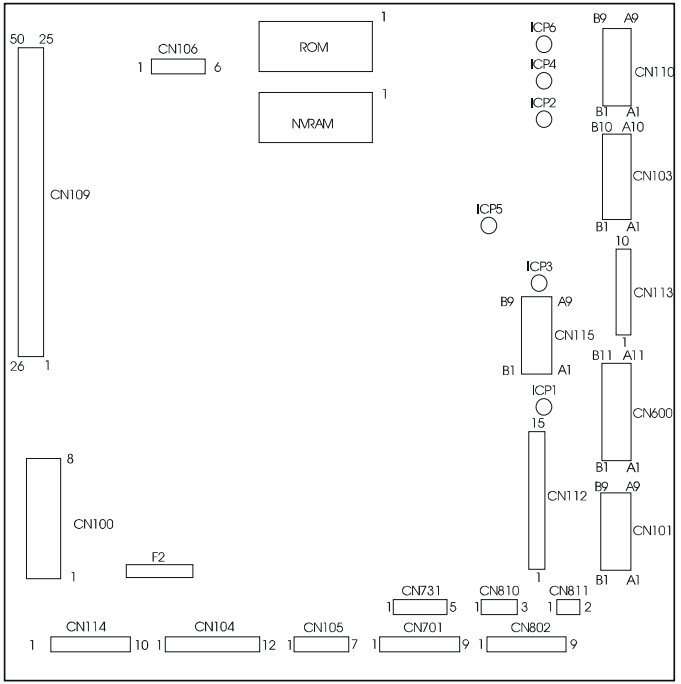
Control board fuses

Name	Drives	Fault indicators
F1	5V to and from the control board	
F2	24V to and from the control board	
ICP1	Cam solenoid (SL4) and 1st paper feed solenoid (SL1)	13.4 Clear front tray input jam (will not pick up paper from the paper tray)
ICP2	Toner supply solenoid (SL3) and registration plate solenoid	
(SL2)	Will generate either a 54.5 Developer Home Position Error or 13.5 Paper Jam	
ICP3	Rear feed unit motor (M7)	13.6 Clear rear tray input jam
ICP4	Developing control motor (M3)	54.5 Developer home position sensor error
ICP5	Face-up/face-down solenoid (SL5) and toner hopper lock solenoid (SL6)	Paper will only exit to either the top or bottom tray, or toner hopper lock fingers will not open
ICP6	Paper exit guide solenoid (SL7)	May cause smearing on transparencies or wrinkled paper as it exits fuser

Control board layout



Color LaserJet control board connector layout



Color LaserJet 5 control board connector layout

9 Training and support resources

Overview

This chapter provides information on obtaining training, support, and materials.

How to get training

Lecture/lab training (U.S. only)

Service technicians who want individual, hands-on training can attend regularly scheduled lecture/lab training classes. These classes are offered throughout the country. To receive the latest schedule, call HP FIRST at (800) 333-1917, or see the HP website (www.hp.com/go/resellertraining) and request document ID number 9104. The latest schedule will immediately be sent to the fax number of your choice. Class schedule and registration information can also be obtained by calling the centralized registration center at (512) 434-1520.

Self-paced training kits

Product	Description	Part number
All LaserJet Printers	Basic Hardware Training Course (prerequisite for all LaserJet service training)	5961-0880
	Paper Specifications for LaserJet Printers	5961-0711 (NTSC) 5961-0712 (PAL)

Support resources—North America

HP Customer Care Reseller Sales and Service Support Center

The HP Customer Care Reseller Sales and Service Support Center is available for technical support to assist service technicians. The support center can be reached at (800) 544-9976 (U.S.).

HP FIRST fax system

HP FIRST (Fax Information Retrieval Support Technology) is a phone-in fax service that provides technical information to HP LaserJet users as well as to service personnel. Receiving a fax requires a group-3 facsimile machine or fax card. Service-related information includes the following:

- Service notes (HP authorized dealers)
- Application notes
- Product data sheets
- Material safety data sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Forms for requesting drivers and the software matrix

HP FIRST, U.S.

Call HP FIRST at (800) 333-1917 (U.S.).

To retrieve service notes

(Authorized dealers and HP customer engineers [CEs] ONLY)

1. Dial (800) 333-1917 (U.S.) from any touch-tone phone.
2. Select (1) for technical support.
3. Select (3) for a password customer.
4. Enter the password: 737842.
5. Follow the voice prompts to enter a document ID number or to select the index.
6. Follow the voice prompts to enter your fax number or the fax number of your customer.

Note

Delivery time depends on the length and complexity of the document.

HP end-user support options

Local support assistance

The user's first source of assistance should be their local dealer or service center. HP continuously provides local computer dealers and service centers with the latest information regarding products and services. To locate the nearest authorized dealer or service center, phone (800) 243-9816 (U.S.) or (800) 387-3867 (Canada).

HP FIRST 24-hour support information

Phone (800) 333-1917 to access the HP FIRST (fax information retrieval support technology) system for 24-hour automated support services. Faxed user support information includes notes for common software applications, and troubleshooting tips. Users may request up to three documents per call.

Electronic information services

For 24-hour access to information via modem, we suggest:

- **CompuServe –** The CompuServe HP Peripherals forum (GO HPPER) provides printer drivers and interactive sharing of technical communication. To subscribe, call CompuServe, Inc. at (800) 524-3388. **Note**: CompuServe is not an official HP support channel, but the forum is maintained and supported by users.
- **Internet –** Printer drivers and product and support information can be obtained from the HP Customer Care Online at http://www.hp.com/cposupport/eschome.html or from the HP anonymous file transfer protocol (FTP) site 192.6.71.2 or ftp-boi.external.hp.com. The site is available to anyone with FTP access to the Internet. Access through the World Wide Web is available at URL http://www.hp.com/go/support or http://www.hp.com/go/resellertraining/.

Printer drivers by mail

To obtain printer drivers, contact the software application manufacturer. HP distributes printer drivers for a few of the most popular applications. Call (970) 339-7009, 6 days a week, 24 hours a day (closed Sundays). Shipping and handling charges may apply on some printer drivers.

Telephone assistance – in warranty

Call the HP Customer Care Center at (208) 323-2551 Monday through Friday from 6 am to 10 pm, Saturday 9 am to 4 pm (Mountain Time) free of charge during the warranty period. However, your standard ong-distance phone charges still apply. Have your system nearby and your serial number ready when calling.

Telephone assistance – post-warranty

Post-warranty telephone assistance is available to answer your product usage questions at the HP Customer Care Center. Call (900) 555-1500 ($2.50 per minute, U.S. only) or call (800) 999-1148 ($25 per call, Visa or MasterCard, U.S. and Canada) Monday through Friday from 7 am to 6 pm and Saturday from 9 am to 3 pm (Mountain Time). *Charges begin only when you connect with a support technician. *Prices subject to change.*

Hardware repair services

To locate a local authorized repair center for hardware repair needs, call (800) 243-9816. HP also offers a variety of service contract options to complement the standard warranty by calling (800) 743-8308 (U.S.) or (800) 268-1221 (Canada).

Additional service phone numbers are listed at the back of this manual.

Support resources—Asia Pacific and Europe

HP Customer Care Centers in Asia Pacific

Country	Customer Care Center	Service Center
Singapore	65-2725300	
Hong Kong	800-96-7729	
Vietnam	84 8 8234530 84 8 8294485	84 4 9431718
Indonesia		62-21-3518788
Phillippines	632-829-5387 632-829-5388 632-829-5389	
Thailand		66-2-661 3900
Malaysia		6-03-7953788 Fax: 6-03-7954423
India	91-11-6826035	
China	86-10-5645858	86-10-62351040-6554 86-10-62385047
Taiwan	886-2-2717-0055	
Korea	02-3270-0700 02-3270-0740	
Australia	03-8877-8000	

HP FIRST, Europe

Call HP FIRST at one of the following numbers:

United Kingdom	(44) (134) 0800-960271
Netherlands	(31) (20) 0800-222420
Belgium (Dutch)	(32) (2) 0800-11906
Germany	(49) (13) 081-0061
Switzerland (German)	(41) (1) 0800-551527
Austria	(43) (1) 0660-8128

For English service outside the above countries, call (31) (20) 681-5792.

A Acronyms and abbreviations

Acronyms and abbreviations

AC	Alternating current
AUTOCONT	Automatic continue
BNC	A 10-Base 2 connector used with coaxial cables
CFG	Configuration on control panel
DC	Direct current
DCPS	Direct current power supply
MS-DOS	Disk operating system
DPI	Dots per inch
DTR	Data terminal ready
DTR line	Data terminal ready line
ECU	Engine control unit
EP	Electrophotographic
EPH	External paper handling
FRU	Field replacement unit
FTP	File transfer protocol
HP FIRST	Hewlett-Packard fax information retrieval support technology
HP-GL/2	Hewlett-Packard graphics language
HTML	Hypertext markup language
HV	High voltage
HVPS	High-voltage power supply
I/O	Input/output
IR	Infrared
IrDA	Infrared Data Association
IRQ	Interrupt request
JEIDA	A type of memory module
JOBID	Print job identification
JP	Job pack
LAN	Local area network

Acronyms and abbreviations (continued)

LED	Light-emitting diode
LVPS	Low-voltage power supply
LC pickup roller	Lower-cassette pick-up roller
MB	Megabyte
MEM	Memory
MIO	Modular input/output
MP pickup roller	Multipurpose tray pick-up roller
MP Tray	Multipurpose tray
MSDS	Material safety data sheets
NF	Noise filter
NTSC	National Television Standard Committee
NVRAM	Nonvolatile random-access memory
Ohm	A unit of measure of electrical resistance
OHT	Overhead transparency
PAL	Phase alternation line format
PCA	Printed-circuit assembly
PCB	Printed-circuit board
PCL	Printer command language
PC pickup roller	Paper-cassette pickup roller
PIU	Paper input unit
PJL	Printer job language
PS	Photosensor
PSD	Product Support Division
RAM	Random-access memory
RFU	Rear Feed Unit
RIP	Raster image process
ROM	Read-only memory
SIMM	Single inline memory module
SL	Solenoid
SMODE	Service Mode
SPEC	Specification
TCP/IP	Transmission control protocol/Internet protocol
TS	Thermoswitch
UNIX	Network operating system using TCP/IP protocol
URL	Universal resource locator
VDC	Volts direct current
VFD	Vacuum fluorescent display

Index

A

accessing
  register adjust mode 89
  service mode 87
accessories, part numbers 123

B

belt cam home position sensor, locating 141

C

cam service mode test 49
cleaning
  drum wrap sensor 57
  laser optics cleaning tool 74
  locations in printer 74
cold reset, performing 108
color balance, adjusting 104
consumables
  identifying 81
  part numbers 123
control board
  connector layout 203, 204
  fuses 202
control panel messages 5

D

developers, replacing 80
drum reflectance calibration 56
drum rotation test 102
drum wrap sensor
  cleaning 57
  locating 143
duplexing 70

E

error log mode 109
extended diagnostics 110

F

front input tray
  preventing multi-feeds 71
  supported media 116
fuser sensor, locating 142
fuses, function 202

H

half self-test, performing 101
hardware repair services 209
HP Customer Care Center 209
HP FIRST 207
HP paper training video 120
HP Parts Direct Ordering 125
humidity sensor test 98

I

identifying consumables 81
Image defects 173
interlock switch, testing 11
internal sensor locations 141

L

laser optics cleaning tool 74
locating
  sensors 139
  solenoids 139

M

maintenance units, replacing 80
mechanism alignment checks 27
media
  paper curl 119
  sizes 116
  troubleshooting problems 68
  types 116
  weights 116
multi-feeds, preventing 71

N

neutralizing corona contacts 23
NVRAM addresses 41
NVRAM values, changing 86

P

paper jams, troubleshooting 68
paper path sensors 69
paper problems, detecting 68
paper-out photosensor, testing 9
part swapping 61
printer
  cleaning 74
  compatible supplies 83
  consumables 123
  line voltage 2
  maintaining 75
  operation commands 86
  protecting 2
  register adjust 86
  replacing maintenance units 80
  replacing toner 80
  storage 2
  testing 86
  troubleshooting 2, 4
  wiring diagrams 198
printer drivers
  obtaining 209
  ordering 209
product
  part descriptions 125
  part locations 125
  parts 125
  servicing 209
  support 207
PS3 service mode test 16
PS8 service mode test 9

R

rear feed unit, preventing multi-feeds 72
rear sensor locations 142
register adjust mode
  accessing 89
  addresses and values 91
  keystroke sequence 90

S

self-paced training kits 206
self-test page
  Color LaserJet 64
  PCL (Color LaserJet 5/5M) 66
  PostScript 65
sensors
  functions 140
  locations 139
service mode
  accessing 87
  flow chart 88
  menu 86
service notes, retrieving 208
SIMMs, ordering 124
solenoid locations 139

subtest number list 97
supplies, compatibility 83
supply augers, testing 31
support information, obtaining 209
support resources 207

T

target toner concentration 46
testing
  cam solenoid 49
  drum rotation 102
  half self-test 101
  humidity sensor 98
  interlock switch 11
  paper tray switches 161
  PS3 sensor 16
  sensors 86
  SL3 31
  supply augers 31
  toner collection box sensor 15
  toner concentration 41
  toner supply solenoid 31
  voltage 63
toner collection box, testing 15
toner concentration levels, correcting 44
toner concentration sensor, locating 143
toner concentration test 41
toner concentration values 43
toner contamination, identifying 103
toner sensor PCA connections 18
toner supply solenoid test 31
toner, replacing 80
training
  obtaining 206
  self-paced training kits 206
training class schedules 206
troubleshooting
  flowchart 4
  paper jams 68
  paper problems 68
  using extended diagnostics 110
  using part swapping 61
  using test components 61

V

voltage test points 63

W

warranty assistance 209
wiring diagrams 198

Service Websites

HP Customer Care Online

Software drivers, support documentation, and frequently asked questions

http://www.hp.com/go/support

HP Technical Training (North America)

Classes and schedules

http://www.hp.com/go/resellertraining

Parts

Parts information

http://outfield.external.hp.com/spi/welcome.htm

For support resources in Europe and Asia Pacific, see page 211.

Service Phone Numbers

All numbers listed are for North America only.

HP Customer Care Reseller Sales and Service Support Center

Dealer pre/post sales and service support

(800) 544-9976 *U.S. Only* **(800) 363-6594** *Canada*

Customer Care Center

User technical-support questions, LaserJet fax

(208) 323-2551

HP FIRST – Fax Information Retrieval System

Service notes, sales information, user help, software information

(208) 344-4809 **(800) 333-1917** *U.S. Only*

Customer Information Center

Sales dealer locations, literature, and specifications

(800) 752-0900 *U.S. Only*

HP Driver Distribution Center

Printer drivers and software application notes orders

(970) 339-7009 *U.S. Only*

Customer Support Sales Center

Authorized repair locations

(800) 243-9816 *U.S. Only*

Parts Direct Ordering / SMO

Service parts, supplies, and accessories orders

(800) 227-8164 *U.S. Only*

Parts Identification

Service part number identification

(916) 783-0804

HP Customer Care Center

Online technical assistance

(800) 477-5526 *HP Only*

Corvallis Customer Service Center

Express exchange and customer return services

(916) 785-1200

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Contents

1 Troubleshooting control panel messages 1

2 Service tools. 47

3 Power supply 65

4 Input/Output (I/O) 69

5 Media specifications 79

6 Toner cartridge information 91

7 Printer options and consumables 103

8 Printer parts 109

9 Image quality 143

10 Wiring diagrams 175

11 Services and support resources 181

A Acronyms and abbreviations 193

Index. 195

Ordering other manuals

This *HP Color LaserJet Family Quick Reference Service Guide* has been created to help the HP LaserJet service engineer quickly troubleshoot common printer problems. While this reference is intended to provide information the service engineer will need for on-site repair of HP LaserJet color products, it is not intended to replace the service manual for any HP LaserJet color product. For detailed information about the HP LaserJet color products described in this guide, see the user guide or service manual for that product.

Service manuals for HP LaserJet products are available from Hewlett-Packard. The phone number for the Service Parts Order Desk is:

(800) 227-8164 (U.S. only)

If you are located outside of the U.S., contact your local HP Sales and Service Office. See “Services and support resources” on page 181.

Supported products

Name used in this guide	Model number	Maximum pages per month	Service manual part number
HP Color LaserJet 4500/4500 N/ 4500 DN	C4084A/ C4089A/ C4094A	35 K	C4084-91077

Note

This guide will be updated as the service needs change, as new products are introduced, or as information becomes available.

1 Troubleshooting control panel messages

Overview

This chapter provides a list of control panel messages for the HP Color LaserJet printers. Alphabetical messages are listed first, followed by numerical messages. Control panel messages that are self-explanatory are not included. See the service manual for more detailed information.

Following the control panel messages are suggestions for troubleshooting paper path problems.

Pre-troubleshooting checklist

WARNING!

Always unplug the printer before servicing. Current is present in the DC power supply whenever the printer is plugged in.

Note

The customer is responsible for ensuring that the maintenance units are in good condition.

Before troubleshooting any specific printer problem, check the following:

- Has the printer been maintained on a regular basis?
- Are all of the maintenance units within their rated life?
- Is the customer using media as specified in Chapter 5, “Media specifications” and the *HP LaserJet Family Paper Specification Guide*?
- Is the media stored correctly and within environmental limits?
- Is the printer installed on a solid, level surface?
- Has the line voltage been checked to make sure that it does not vary more than 20% from the nominal rated value specified on the power-rating label?
  - Large motors used near the printer can cause temporary voltage changes.
- Is the operating environment within the parameters listed in the printer service manual?
- Is the printer protected from substances such as office cleaning materials and the ammonia gas that is produced by diazo copiers?
- Is the printer protected from direct sunlight?
- Have all non-HP components (toner, typeface DIMMs, memory boards, and MIO cards) been removed from the printer?

CAUTION

Using non-HP components, such as toner cartridges, may cause permanent damage to the printer.

- Has the printer hardware or software configuration changed? Or could the problem be associated with any specific software?
  - Contact the Customer Care Center for software-related problems (see Chapter 11, “Services and support resources”).
- Could the problem be related to network configuration changes?
  - Remove the printer from the network and make sure that the failure is associated with the printer before beginning troubleshooting.

Control panel messages

Alphabetical messages

Access denied, menus locked

This message is displayed for approximately 5 seconds when a user has attempted to select a menu value while the printer control panel locking is enabled.

- See the system administrator for access to the printer control panel.

Bad duplexer connection

The duplex unit is not correctly installed.

1. Check that the duplex unit's short power cord is plugged into the printer and that the power cord is plugged into the duplex unit.
2. Turn the printer off, and then turn the printer on.
3. If the error continues, verify that the duplex unit is correctly installed.
4. If the error persists, replace the duplexer.

Calibration executing

The printer is executing an internal color calibration. This process should take approximately 90 seconds.

- No action is required.

Canceling job

The printer is canceling the current print job. Incoming data for the current job will be discarded.

- No action is required.

Cannot duplex check rear bin alternates with Cannot duplex check paper

The printer cannot duplex because the rear output bin is open or the media is not supported by the duplex unit.

1 Close the rear output bin.

2 If the error message does not clear, turn the printer off then on.

3 Verify that the media is supported by the duplex unit.I

Checking printer

The printer is performing an internal test. This process should take approximately 30 seconds. The message is displayed during the initiation of the engine test. When finished, the printer goes online.

- No action is required.

Clearing paper from printer

The printer has jammed or was turned on and media was detected in the paper path. The printer is attempting to clear these pages.

- No action is required.

Close middle front drawer

The drawer that holds the intermediate transfer belt (ITB) is open. Switch SW1 indicates the drawer is open. When the drawer is closed, a plastic protrusion on the lower left corner of the drawer pivots an arm allowing SW1 to toggle to the open position.

1 Close the ITB drawer.

2 If the message persists, remove the printer's left-side cover and inspect the mechanical linkage that closes SW1.

3 Refer to the wiring diagram to verify the wiring; the two-wire connector should be firmly seated to SW1 and the wiring harness should be firmly seated to connector J1003 of the DC controller PCB.

4 If the message persists, use an ohmmeter to verify the functionality of SW1.

Close upper rear door

Switch SW5 monitors the closing of the printer's upper rear door (this door allows you to access the fusing assembly). When the fusing door is closed, a tab on the rear door pushes a door switch actuator that runs along the left side of the printer and closes SW5.

WARNING!

High voltages occur during operation. Closing the rear door, drum drawer, and ITB drawer closes SW4 and SW5, enabling +24B Vdc. When either drawer or the rear door is open +24B Vdc is disabled. This safety feature protects the operator from high voltages.

1. Close the upper rear door.
2. If the message persists, remove the printer's left-side cover and inspect the mechanical linkage of SW5 and the lever.
3. Refer to the wiring diagram and verify that all connections (J103 of the DC controller PCB and SW5) are firmly seated.
4. Verify that both the drum drawer and ITB drawer are firmly closed; closing these drawers also closes SW4.

Close top cover

SW2 indicates if the printer's toner cartridge access door is closed. When the toner cartridge door is closed a lever is pushed down. This in turn rotates a pivot forward, opening the top cover switch (SW2).

1. Close the top cover.
2. If the message persists, remove the printer's top cover and verify all mechanical linkages associated with SW2.
3. Verify that the connector on J1003 of the DC controller PCB is firmly seated.

Close upper front drawer

The drawer that holds the imaging drum is open. Switch SW3 indicates that the drawer is open. When the drawer is closed a plastic protrusion on the lower left corner of the drawer pivots an arm that allows SW3 to toggle to the open position.

WARNING!

Closing the drawer also closes SW4 (the front drawer switch). When SW4 is open +24B Vdc is disabled. This safety feature protects the operator from any high voltages when the drum drawer or ITB drawer is open.

1 Open the drawer and firmly push the drawer closed using one hand in the middle of the drawer.

2 If the message persists, remove the printer's left-side cover and inspect the mechanical linkage that closes SW3.

3 Refer to the wiring diagram (chapter 10) and verify the wiring; the two-wire connector should be firmly seated to SW3 and the wiring harness should be firmly seated to connector J1003 of the DC controller PCB.

4 If message persists, use an ohmmeter to verify the functionality of SW3.

Cold reset

The cold reset power-up sequence has been entered.

- Most printer variables will reset to their factory default values.

Continuous page, press cancel job

The printer configuration page is being printed continuously.

- Press **CANCEL JOB** to terminate continuous configuration page printing and return the printer to the READY state.

Density sensor out of range alternates with Clean density sensor

A density sensor out of range error was detected during a color calibration.

- The density sensor may be dirty. Inspect and clean the sensor. See “Cleaning the toner density sensor” in the service manual.

Data received

The printer has received and processed data and is waiting for a form feed.

- Press **CANCEL JOB** and resend the last page of the job, making sure a form feed is sent with it.

Diagnostics mode

The extended diagnostics power-up key sequence has been entered. Refer to the diagnostics procedures provided in the service manual.

- No action is required.

Drum error replace drum kit

An error has been detected with a component of the print drum kit.

- Replace the print drum kit.

Drum life low replace drum kit

Approximately 80% of the drum's life has been consumed.

- Drum replacement will be required in the near future.

Drum life out replace drum kit

The imaging drum has reached the end of its expected life.

- Replace the print drum kit.

Duplexer error check duplexer

An error has occurred in the duplex unit.

1. Verify that the duplex unit is correctly installed.
2. Verify that the small power cord from the duplex unit is plugged into the printer and the power cord from the AC outlet is plugged into the duplex unit.

EIO x initializing yyy alternates with Do not power off

The EIO device in slot "x" is initializing. The yyy value will increment every 10 seconds during this process.

- No action is required.

EIO x not functional

The EIO slot specified does not have a card installed or is not functional.

- No action is required.

Event log empty

SHOW EVENT LOG was selected from the Information menu, but the event log has no entries.

- No action is required.

Fuser life low replace kit

Approximately 95% of the fuser's life has been consumed.

- Fuser replacement will be required in the near future. Continue printing, or replace the fuser kit.

Fuser life out replace kit

The fuser has reached the end of its expected life.

- Replace the fuser.

Install drum kit

The drum kit is not installed or is incorrectly installed.

- Verify that the drum kit is correctly installed.

Install Tray 2

The printer cannot print until media is loaded into Tray 2. The paper path for Tray 3 passes through Tray 2.

- Insert Tray 2 into the printer so that printing from either Tray 2 or Tray 3 can begin or continue.

Memory full stored data lost

The printer has no available memory. The current job may not print correctly. Some downloaded fonts may have been deleted.

- Try printing simplified pages. If this does not resolve the problem, add printer memory.

Memory settings changed

The I/O buffering settings were changed by the printer because there is not enough memory available to use the previous settings.

- No action is required. However, adding printer memory can prevent this from occurring.

Memory shortage job cleared

The available memory was not enough to continue printing. The remainder of the job was canceled.

- Adding printer memory can prevent this from occurring.

Memory shortage page simplified

The printer's adaptive data compression had to resort to lossy compression to fit raster graphics in the available memory. This has caused a data loss in the raster output.

- Reduce the complexity of the page to improve the print quality.

Note

Adding memory will not correct this problem.

No job to cancel

CANCEL JOB was pressed but there is no active job or buffered data to cancel. The printer automatically returns to the READY state.

- No action is required.

Page cannot print now alternates with Retry when printing stops

An internal page has been requested while the printer is printing an incoming job. Interrupting the job to print the internal page would corrupt the job's environment and potentially cause the job to finish printing incorrectly after the internal page is completed. Consequently, internal pages are not permitted to interrupt jobs and can only be printed when the printer is idle.

- Retry print job after printer has completed current job.

Page simplified

The printer's adaptive data compression had to resort to lossy compression to fit raster graphics in the available memory. This has caused a data loss in the raster output.

- Reduce the complexity of the page to improve the print quality.

Note

Adding memory will not correct this problem.

Page too complex to print alternates with Press Go to continue

The page could not be printed.

Note

Reducing the complexity of the page could allow it to print successfully. Adding memory will not correct this problem.

1. Press **GO** to continue printing (you may notice poor print quality on this page).
2. Press **CANCEL JOB** to terminate the entire job.
3. Reduce the complexity of the page; this may allow it to print successfully.

Press Go to print alternates with Press Select to change toner

The top cover was opened and closed when the printer was not in the toner cartridge replacement mode.

- Press **GO** to resume printing or press **SELECT** to enter the toner replacement menu.

Printer language not available

The printer received a request for a new language (personality) that does not exist in the printer.

- No action is required.

Reinstall transfer belt

This message occurs if you do not have the intermediate transfer belt (ITB) installed in the printer or if the home positions (marks on the ITB) are not detected by sensor PS5.

Note

The intermediate transfer belt must be rotating before PS5 is able to detect the “home position” marks on the ITB. Both the ITB and the imaging drum are driven by the drum motor (M4).

1. Check SW1 for correct operation and make sure the cables are connected.
2. Verify that the ITB is installed in the printer.
3. If the ITB is installed and seated properly, verify that PS5 is not damaged. PS5 is located on the ITB assembly. If the sensor appears damaged, replace the entire ITB assembly.
4. Clean PS5.
5. Verify all wiring within the ITB drawer. Note the connection on the ITB assembly (located on the front, lower, left-hand corner of the assembly). When the drawer is closed the connector “mates” with a receptacle connector on the drawer. Verify that the connector and all wiring are in good condition.
6. Place the printer in diagnostic mode and run the drum test to verify drive spindle movement for both the drum and the ITB.
7. If the imaging drum is not rotating, verify that the imaging drum connector is firmly seated into the J204 connector of the developing PCB.

Remove paper top output bin

The top output bin holds 200 sheets of paper. Sensor PS9 along with its sensor flag detects the height of the output paper stack. Perform the following items if this message appears with no paper in the output bin.

1. Verify that PS9 moves freely and its movement is not blocked.
2. Verify that PS9 is free of dust and debris (the printer's top cover must be removed to access the sensor).
3. Verify that the PS9 sensor flag and arm move freely.
4. Verify that all connectors are firmly seated. Refer to the wiring diagram in chapter 10.

Note

PS9 (a three-wire sensor) plugs into a through-wall connector on the printer's chassis and then into a 14-pin wire harness, which plugs into J206 on the developing PCB. All signals from the developing PCB are routed to J201 on the developing PCB to J1017 on the DC controller PCB.

Resetting memory

The printer is executing a memory reset. The printer returns to the READY state upon completion of this process.

- No action is required.

Resetting values finished

The color calibration density values have been reset to their default values.

- No action is required.

Select language

The language selection power-up key sequence has been entered. The printer will prompt the user to select a new control panel display language once it has completed its initialization process.

- Select a new language when prompted.

Service mode

The service mode power-up key sequence has been entered. The printer will remain in service mode until **Go** is pressed.

- Press **Go** to exit the service mode.

Toner CMYK low

The toner cartridge specified is low on toner. This message appears if `TONER LOW = CONTINUE` (default) is set on the front panel in the configuration menu.

- Printing will continue until a `TONER OUT` message appears. To change the toner cartridge now, press **Select**.

Toner CMYK low alternates with Press Select to change toner

The toner cartridge specified is low on toner and must be replaced. This message appears when `TONER LOW = STOP` is set on the front panel in the configuration menu.

- Press **Select** to enter the toner replacement menu.

Toner CMYK out alternates with Press Select to change toner

The toner cartridge specified is out of toner.

- Press **Select** to enter the toner replacement menu.
- Press **Go** after replacing the toner cartridge.

Toner position [color] = [state]

Indicates the current state of a particular toner cartridge. This message is displayed when **SELECT** is pressed while a TONER LOW/OUT message is displayed.

- If necessary, replace the specified toner cartridge.

Transfer kit low replace kit

The transfer kit is near the end of its expected life.

- Although printing can continue, the transfer kit should be replaced for optimum printer operation.

Transfer kit out replace kit

The transfer kit has reached the end of its expected life.

- Replace the transfer kit.

Tray x empty [type] [size]

The specified tray is empty but the current job does not require this tray to complete the job.

- No action is required. However, to avoid this message in the future, load the proper media type and size into the tray.

Tray x load [type] [size]

The specified media type and size need to be loaded into the requested tray.

- Load the specified media type and size into the requested tray. Press **Go** to override this request and cause the page to be printed on different media.

Tray x size [size]

Media has been loaded into the tray specified on the control panel. The most recently configured size will be displayed with an asterisk next to it.

- Use **-VALUE+** to view all possible sizes.
- Press **SELECT** for the currently displayed size.
- Press **GO** to clear the message.

Tray x type [type]

Media has been loaded into the tray specified on the control panel. The most recently configured type will be displayed with an asterisk next to it.

- Use **-VALUE+** to view all possible sizes.
- Press **SELECT** for the currently displayed type.
- Press **GO** to clear the message.

Waste toner full replace drum kit

Waste toner full sensor PS13 detects a waste toner full condition. Light receiver and light pipe arrangement along with a window in the drum assembly look for a waste fill condition. Verify that the sensors and light pipes are not blocked.

1 Replace the drum kit.

2 Check the sensor, and if it is defective, replace it.

Numerical messages

13.xx Paper jam

xx = Description:

0 = Jam in input feed area
1 = Jam in fusing area
2 = Jam in fusing area
3 = Jam in duplex reversing unit
4 = Jam in duplex feed unit
5 = Jam in duplex paper feed area
6 = Jam in duplex paper feed area
7 = Jam in paper feed area
8 = Door open jam
9 = Irregular paper jam in paper path
10 = Paper in the paper path is too short
11 = Paper in the paper path is too long

- See “Troubleshooting paper path problems” on page 40.
- Note the location of the leading edge of the first jammed piece of media.
- Note the paper jam message.
- Note the location of the media.

13.xx Paper jam alternates with Check all rear door

Media is jammed in the rear paper path or rear duplexing area.

1 Open the rear duplex cover (if installed) and remove any jammed media.

2 Open the upper rear door and remove any jammed media.

13.xx Paper jam alternates with Check middle front doors

Media is jammed in the transfer belt area or media is not picking.

- Open the ITB drawer and remove any jammed media.
- Watch the pick roller to ensure it is turning.
- Check for media between the transfer roller and the fusing assembly.
- Make sure the transfer roller is in place.

13.xx Paper jam alternates with Check front duplex drawer

Media is jammed in the front duplexing area.

- Open the front duplex drawer and remove any jammed media.

13.0 Paper Jams

1 Check to see if the white plastic tabs (located inside the front of the trays under the separation tabs) have fallen off in Tray 2 or Tray 3. (Note the position of the springs.)

2 Make sure that the correct media is loaded properly in Tray 3, and that it is not overloaded.

3 Make sure that the two shipping locks have been removed from the back of Tray 3.

4 Inspect the pick-up rollers for Tray 2; the flat side of the “D” on the rollers should be parallel to the paper.

5 Make sure that the roller spring underneath the front of Tray 2 is secure.

13.1 Paper jam open middle front drawer alternates with Check in rear of drawer

A jam has occurred inside the ITB drawer area. The jam may be located in the fuser area or between the transfer area and the fuser.

1 Open the ITB drawer and carefully inspect for any media.

2 Be sure to inspect the fusing area. You may need to access the fusing area through the rear door.

3 Remove any jammed media.

20 Insufficient memory alternates with Press Go to continue

More data has been received from the computer than fits in the printer's internal memory.

1 To continue printing, press **Go**. Only the amount of data that fits in the printer's internal memory is printed.

2 To cancel the job, press **Cancel Job**.

3 Add more memory to resolve the problem.

22 EIO x buffer overflow alternates with Press Go to continue

The EIO buffer for the EIO card in slot "x" has overflowed during a busy state.

- The current data in the print buffer will be lost.
- Press **Go** to resume printing and then resend the job.

22 Parallel IO buffer overflow alternates with Press Go to continue

This message indicates that the parallel buffer has overflowed.

- The current data in the print buffer will be lost.
- Press **Go** to resume printing and then resend the job.

40 EIO x data error alternates with Press Go to continue

A connection with the card in the specified slot has been broken.

1. Check that all cables are connected to the EIO ports and that the EIO board is seated properly.
2. If possible, print to another network printer to verify that the network is working properly.

Note

All data in the print buffer will be lost.

41.3 Unexpected paper size alternates with Check paper in Tray x

A tray is configured for a specific paper size, but the sheet loaded is a different size. This error often occurs when the printer is multifeeding.

- Load the tray with the requested size media.

41.5 Unexpected paper type alternates with Check paper in Tray x

A tray is configured for a specific media type, but the printer detects that a different media type is loaded. The most common cause for this error is a paper jam at the registration plate (under the ITB) where the customer does not remove the paper. The engine tries to check the OHT sensor and receives an error.

1 Verify that the correct media is loaded in the input tray and that the printer control panel is configured correctly.

2 Clean the detection windows of OHT sensors 1 and 2.

49 Error xxxx cycle power

A firmware error has occurred, causing the processor on the formatter to abort operation. This type of error can be caused by invalid print commands, corrupt data, or invalid operations. In some cases, data transmitted to the printer can become corrupt by electrical noise introduced into the cable. Other causes include poor quality parallel cables, poor connections, or home grown applications. On rare occasions the formatter is at fault and is usually indicated by a 79 Service Error.

1 Verify that all cables are connected.

2 Turn the printer off and on to reset the printer.

3 Cancel all print jobs; then, resend to isolate any offending print job.

4 If the formatter pan assembly or DC controller was removed, make sure the ribbon cable between the DC controller and the interconnect PCB is connected.

5 Delete the print job from windows spooler or from the printer server.

Note

The front panel will display 49 (FFFF) and the display will be dark if the ribbon cable is not connected.

6 To verify that the formatter is functioning, run the formatter test available in Diagnostic mode. If the formatter passes the test, the formatter is not defective. DO NOT replace the formatter.

49 ADAC or AFAC

The printer is printing a PostScript file using WIndows 3.1 or 9x.

No action is necessary.

49 FF01 to FF05

An NEC firmware ROM error has occurred.

Replace the firmware.

49 FF02

Unsupported EDO memory has been installed.

Remove unsupported memory.

49 04CC

Indicates a media timing issue. This occurs when printing multiple copies of transparencies or heavy or glossy media with either the PCL or PostScript drivers. Or it could indicate a timing mismatch between the engine and formatter.

49 04E7

Occurs during decompression of the strip buffers when the end of the strip marker is missing. This is triggered by one of the following: 1) Marker is corrupt; 2) Strip buffer size given to HiLite is too small; 3) Strip buffer size given is too large.

Note

This error is primarily associated with the firmware and should not require a new formatter.

49 04FF

A large print job (800 to 1200 pages) or complex graphics can cause the printer to quit printing.

Two courses of actions are available:

1) Determine the page that is causing the failure. If there is an image on the page, try to move the image down on a portrait page or left on a landscape page to move the image out of the strip that is failing. The movements will need to be very small so as not to cause the next strip to fail.

2) Put the printer in Lossy mode with a sequence of PJL commands. (Lossy compression is the process of compressing a file such that some data is lost after the file is compressed and decompressed.) Use the following series of commands to put the printer into Lossy mode:

ESC%-12345X@PJL

@PJL Default Service mode=HPBOISEID
@PJL Default Diagnostics=ON
@PJL Enter Language = PCL

ESC%-12345X@PJL

Esc*z9999P
Esc*z50P
Esc*z201X

To turn off Lossy mode once the file has printed, use the following commands:

ESC%-12345X@PJL

@PJL Default Diagnostics=OFF
@JPL Default Service Mode=EXIT
@PJL EOJ
ESC%-12345X@PJL

Note

Putting the printer in Lossy mode may affect performance and print quality.

49 FFFF

Issue reported by life test when replacing the fuser. Error may also occur during the boot cycle.

Replace the formatter.

49FFOX

This error allows you to scroll through the printer control panel to obtain all of the error information.

No action necessary.

49 OBOA

A request is not understood. This error message is generated when the I/O card does not support a command that was sent to it.

Check the command being sent; the I/O card may not support a particular feature.

49 OB22

This error message is generated when the I/O card receives a control panel menu action that it does not recognize.

Verify the action being sent.

50.x Fuser error

The fusing assembly contains two heating bulbs, two thermo-switches, and two thermistors. AC power is provided to the fusing assembly via the DC power supply, which is controlled by the DC controller PCB. The thermistors monitor the temperature of the fusing assembly and provide feedback to the DC controller PCB to regulate the fusing temperature. The two thermo-switches are wired in series with the fusing bulbs. They “open” if the temperature exceeds 240° C (464° F).

x = Description:
1 = Low temperature error
2 = Fuser warm-up service

3 = High fuser temperature
4 = Faulty fuser
5 = Fuser voltage mismatch (verify that you have NOT installed a 110V fuser in a 220V printer or vice-versa)
6 = Fuser heater cutoff
7 = Fuser motor malfunction (see recommended action for 50.7 Fuser error)

Note

A visual check to determine if the fusing assembly is functional can be made by defeating the rear door interlock switch. To do so, press in on the white plastic button above the left-rear corner of the fan while turning the printer on. If the fusing bulbs and thermoswitches are good, you should observe light from the lower fusing bulb as the printer warms up.

1 Turn the printer off and on to reset the printer. If the error persists, try re-installing the fusing assembly. If the error continues to persist, proceed to step 2.

2 Turn the power off and remove the fusing assembly. Measure the resistance between pin 3 and pin 4. The resistance should be between 6+/-2 ohms. If there is no continuity between pins, it may be assumed that either a heating bulb and/or a thermo-switch is “open.” Replace the fusing assembly. If resistance limits were acceptable, proceed to step 3.

3 Measure the resistance for both the upper and lower thermistors. The resistance should be between 430K ohms and 310K ohms at room temperature (25° C or 77° F). If the resistance exceeds limits, replace the fusing assembly. If resistance is within limits proceed to step 4.

4 Verify, that the connectors at J1011 of the DC controller PCB and J1 of the DC power supply assembly are firmly seated.

5 Replace the power supply assembly.

50.7 Fuser error

The fusing motor (M1) drives the fusing assembly, the paper transport (web) assembly, ITB lift mechanism, transfer roller, transfer roller lift mechanism, the face down output delivery assembly. A 50.7 fuser error is displayed when no motion is detected within the fuser by PS6. Photosensor PS6 is the fusing unit pressure switch (see the service manual for more information).

1 Power cycle the printer to try to clear the message.

2 Remove the left-side cover of the printer. Verify that the fusing motor (M1) connector is seated firmly into J102 of the feed PCB.

3 Ensure connector at J110 of the feed PCB is firmly seated (this connector contains the wiring for PS6 which provides fuser motion feedback).

Note

Closely inspect the gears along the gear drive path. Make sure there is no binding. Binding of the gears may prevent M1 from rotating.

4 If the error persists, observe the drive shaft of M1. If this shaft DOES NOT rotate, the failure is related to the motor drive circuitry. Referring to the printer's wiring diagram, verify that connectors J102 and J106 of the feed PCB are firmly seated. If there still is an error, replace the fusing motor and then feed PCB in sequence.

5 If the shaft rotates (both forward and reverse), and the 50.7 fuser error is displayed, the cause of the error is related to the motion feedback circuitry. Remove the fusing assembly and verify that the sensor flag is in good condition and functional. Verify that the connector at sensor PS6 is firmly seated; clean the sensor of dust and debris. If the error persists, replace sensor PS6.

51 Laser error

This message indicates that a laser malfunction has occurred due to a beam detect error or laser failure.

1. Turn the printer off and on to reset the printer.
2. Verify that connectors J1102 on the laser driver PCB and J1008 on the DC controller are seated properly.
3. Verify that connectors J551 on the beam detect PCB and J1006 on the DC controller are seated properly.
4. Replace the laser scanner assembly.

52 Scanner error

This message indicates that a scanner error has occurred.

1. Turn the printer off and on to reset the printer.
2. Verify that connectors J551 on the beam detect PCB, J1103 on the scanner motor, and J1006 on the DC controller are fully seated and connected correctly.
3. Replace the laser scanner unit.

53.xy.zz Printer error

This message indicates a memory error. If a DIMM caused the error, the DIMM will not be recognized (configured).

x = Memory Type
0 = ROM
1 = RAM

y = Device Location
0 = Onboard
1 = DIMM slot 1
2 = DIMM slot 2
3 = DIMM slot 3

zz = Error Number
0 = Unsupported memory
1 = Unrecognized memory
3 = Failed RAM test

1. Verify that the DIMM board is installed correctly and the DIMMs are configured correctly.
2. Turn the printer off and on to reset the printer.
3. Remove and replace the DIMM that caused the error.

54.1 Printer error control panel messages

This message indicates that an internal power failure has occurred.

1. Turn the printer off, and then turn the printer on.
2. Replace the high-voltage power supply.
3. Check the fuser to ensure jams have not occurred.

CAUTION
When clearing jams, damaging the thermistor can cause this error.

4. Make sure there is not a fluctuation with the power supply to the printer. Check that the electrical specifications are met.
5. Replace the low-voltage power supply.

54.2 Printer error control panel messages

An error 54.2 indicates that a problem exits with the carousel assembly. Either the carousel is not rotating or a sensor has failed. Diver motor (M3) drives the toner cartridge carousel. If motion is not detected, a 54.2 error is displayed. M3 is a 6-phase stepping motor and receives its drive signal from J203 of the developing PCB. Photosensor PS10 monitors “movement” (and the position) of the toner cartridge carousel. Different width tabs (four tabs, one for each cartridge) on the left end of the carousel-housing pass through PS10 to provide positioning information. The black toner cartridge tab is the “home” position. Toner cartridge positioning within the carousel is monitored by PS11. If PS11 fails or is improperly connected a 54.2 error is displayed. Another indicator of this failure mode is that the carousel starts to rotate, and then stops immediately.

1 Turn the printer off and then on to reset the printer.

Note

The printer CANNOT operate with the top cover removed unless the carousel brake has been released or removed.

2 Open the color toner door and look for an obstruction. If necessary, remove the toner cartridges individually by manually releasing the carousel brake and rotating the carousel to each cartridge position to remove the cartridges. Turn the printer off and on to reset the printer.

3 Verify that the carousel drive motor wiring harness is firmly seated into connector J203 of the developing PCB.

4 Verify that PS10 is working correctly and not excessively dirty (clean if necessary). Also verify that the wiring harness is firmly seated into both the sensor assembly and into connector J206 of the developing PCB.

5 Verify that PS11 is connected and functioning properly. The error message can also occur if this sensor is installed backwards.

6 Verify that all connectors to the developing PCB and the DC controller PCB are firmly seated. Verify that the rotary drive assembly is working. Replace it on older units with more than 50K of life.

Note

The following URL provides help with toner cartridge installation and removal: http://www.hp.com/cposupport/manindex/hpcolorlas7857_en_man.html.

54.3 Printer error

The printer is NOT receiving data back from the density sensor (PS14). PS14 is located in the bottom of the imaging drum drawer. During calibration routines, a series of images are written on the imaging drum and the densitometer measures the density of the image (i.e. the amount of toner that is placed into the drum). These measurements provide the feedback to ensure image quality is consistent throughout the life of the consumable.

1 Verify that the densitometer is clean; perform the toner density sensor cleaning procedure in the online user guide that came with the printer.

2 Inspect the density sensor wiring harness for damage. The harness runs from the density sensor through the left-side upper control arm of the imaging drum drawer to J1010 of the DC controller PCB. Verify that the cable is firmly seated into the J1010 of the DC controller PCB.

3 If the error persists, replace the density sensor assembly.

54.4 Printer error

Optional equipment is not recognized.

- Turn the printer off and on to reset the printer.

54.5 Printer error

This message indicates a waste toner sensor malfunction.

1 Turn the printer off and on to reset the printer.

2 Remove the drum cartridge and clean the waste toner detection window with a dry cloth.

3 Clean the waste toner sensor unit at the printer side with a dry cloth.

4 Check the light guide and clean if necessary. Replace if the ends are scarred.

5 Reconnect the waste toner sensor unit connector and the DC controller PCB connector (J1009) correctly.

6 Replace the waste toner sensor (PS13).

54.6 Printer error

The OHT sensor has reported an error condition. This can be caused by contamination in the connectors, a blocked sensor, or a defective sensor.

1 Remove the ITB and verify that the OHT sensor prism is in place.

2 Lift the registration flap and verify that the OHT sensor is not blocked.

3 Remove the ITB drawer and inspect the drawer connectors for contamination such as a piece of paper.

4 If the error persists, verify that all connectors are firmly seated.

5 Replace the ITB drawer.

55 DC controller error

The print engine is not communicating with the formatter. The communication link between the formatter and DC controller was lost. This can occur due to a timing error or intermittent connection between the formatter and the DC controller.

1 Turn the printer off and on to reset the printer.

2 Reseat the connectors between the formatter and DC controller.

3 Only if the error persists, replace the DC controller making sure to perform the calibration and color plane alignment procedures.

57.1 Fan failure

The printer detected that the fan (an exhaust fan located in the upper, left-rear corner of the printer) was not rotating. This fan operates off +24 Vdc and is enabled by the DC controller PCB's microprocessor.

1 Turn the printer off and on to reset the printer. Visually check to see if the fan is rotating. (If you cannot see any rotation, place your hand over the outlet vents to see if exhaust air is moving).

2 Remove the printer's left-side cover. Check to see if anything is preventing the fan from rotating freely.

3 Verify that the fan's connector is firmly seated into connector J208 of the developing PCB.

4 If the error persists, replace the fan.

57.2 Fan failure

The printer detected that the fan (an exhaust fan located in the upper, right rear corner of the printer) was not rotating. This fan operates off +24 Vdc and is enabled by the DC controller PCB's microprocessor.

1. Turn the printer off and on to reset the printer. Visually check to see if the fan is rotating (if you cannot see any rotation, place your hand over the outlet vents to see if exhaust air is moving).
2. Remove the printer's left-side cover. Check to see if anything is preventing the fan from rotating freely.
3. Verify that the fan's connector is firmly seated into connector J209 of the developing PCB.
4. If the error persists, replace the fan.

57.3 Fan error alternates with Close upper front drawer

The intake fan is located in the front center of the drum drawer. (The drum drawer is referred to as the upper front drawer for end users.) Fan rotation stops when the drawer is opened. A fan error is displayed when fan motion is **NOT** detected by the DC controllers microprocessor if the drawer is closed and the printer is not in PowerSave mode.

1. Turn the printer off and on to reset the printer. Due to the difficulty of observation, listen to hear if the fan is rotating.
2. Verify that FM3 connector 27 is not damaged or broken.
3. Verify that the fan connector is firmly seated into connector J1022 of the DC controller PCB.
4. If the error persists, replace the fan.

62 No system

This message indicates that there is a printer firmware problem. Either there is no firmware DIMM installed or the DIMM has failed. If the formatter was just replaced, make sure all DIMMs have been moved from the old formatter to the new one.

1 Turn the printer off and on to reset the printer.

2 Reseat the firmware DIMM, making sure the it is in the slot surrounded by a white line with the text “ROM ONLY IN THIS SLOT.”

62.x Printer error

This message indicates that a problem exists with the internal memory.

x = Description
0 = Internal memory
1-3 = DIMM slots 1-3.

1 Turn the printer off and on to reset the printer.

2 Reseat and then replace the DIMM.

3 Replace the formatter board.

62.m Bad MPTR

The firmware ran out of memory trying to build the static entity directory.

1 Check the printer settings to determine which values have been changed.

2 Clear the message by pressing **Go**.

68 NVRAM error check settings

One or more settings saved in the non-volatile storage device are invalid. Some settings may have been reset to factory defaults.

1. Check the printer settings to determine which values have been changed.
2. Clear the message by pressing **Go**.

68 NVRAM full check settings

This message indicates that a non-volatile storage device is full. Some settings may have been reset to factory defaults.

1. Check the printer settings to determine which values have been changed.
2. Clear the message by pressing **Go**.

79 Service (xxxx) printer error

A hardware error has occurred.

x = Description
01xx = IO ASIC register error
02xx = video ASIC register error
03xx = IDE ASIC register error

1. Reseat the formatter.
2. Reseat the firmware DIMM.
3. Run formatter diagnostics.
4. Replace the firmware DIMM.
5. Replace the formatter.

80 Service (xxxx) EIO error

A critical EIO failure has occurred. X indicates the slot number of the device and xxxx indicates the error type.

1 Turn the printer off and on to reset the printer.

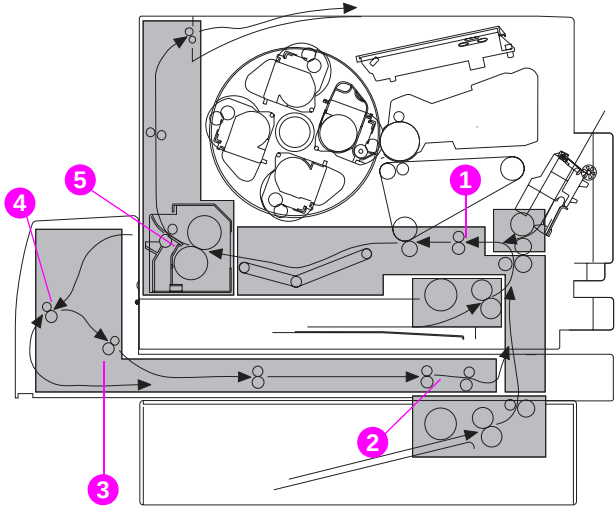
2 Reseat the EIO card.

3 Replace the EIO card.

Troubleshooting paper path problems

Paper jams

Paper jams are posted if paper fails to arrive at or clear the paper path sensors in the allowed time. Dedicated paper sensors (PS2, PS7, PS3101, PS3103, and PS3104) detect whether paper is present in the sensor and if the paper is fed normally (see the figure below). When the control board detects a paper jam, it immediately stops the printing process and displays the appropriate paper jam message for the sensor that detects the paper jam.



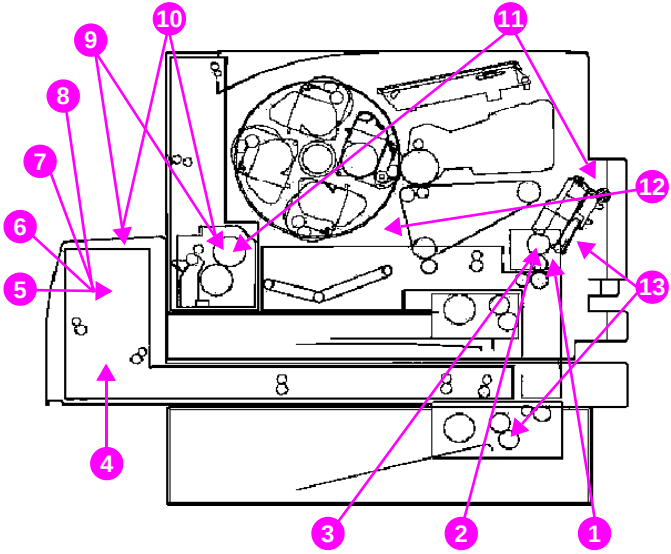
Paper jam sensors (shown with the optional 500-sheet paper feeder and duplex unit installed)

Paper jam sensors

1	Registration paper sensor (PS2)
2	Duplex paper-pick sensor (PS3104)
3	Reversed unit paper sensor (PS3103)
4	Reversed paper sensor (PS3101)
5	Delivery paper sensor (PS7)

Paper jam locations

Use the figure below to troubleshoot paper jams in the printer. For instructions on clearing paper jams, see the sections later in this chapter.



Paper jam locations (shown with the optional 500-sheet paper feeder and duplex unit installed)

See the next page for the associated error messages.

Table 1-1 Paper jam locations and associated error messages

1	13.11 Paper in the paper path is too long. Check the Tray 1 area. Check the entire paper path.	8	13.3 Jam in duplex reverse unit. Inspect the rear of the duplex unit and the duplex tray.
2	13.10 Paper in the paper path is too short. Check the Tray 1area. Check the entire paper path.	9	13.2 Jam in fusing area. Check the fuser assembly, output assembly, and duplex unit.
3	13.9 Irregular paper jam in the paper path. Check the Tray 1 area. Check the entire paper path.	10	13.1 Jam in fusing area. Check the fuser assembly, output assembly, and duplex unit.
4	13.8 Door open jam. Check the rear door, duplex cover, and rear output door. 13.7 Jam in paper feed area. Check the entire paper path.	11	13.1 Paper jam. OPEN MIDDLE FRONT DRAWER alternates with CHECK IN REAR OF DRAWER. Check the middle front drawer. Check and pull out the fuser.
5	13.6 Jam in duplex paper feed area. Inspect the rear of the duplex unit and the duplex tray.	12	13.1 Paper jam: Check in rear of drawer. Check the rear of the middle front drawer. Reseat the transfer roller.
6	13.5 Jam in duplex paper feed area. Inspect the rear of the duplex unit and the duplex tray.	13	13.0 Jam in input feed area. Check the input trays and duplex unit
7	13.4 Jam in duplex unit. Inspect the rear of the duplex unit and the duplex tray.		

General paper path checklist

- Verify that media is correctly loaded in the input trays and that all length and width guides are set correctly.
- Clean the printer. Toner and paper dust in the paper path inhibits free movement of media through the printer and blocks the sensors.
- Vary the input and output selections of the printer to determine if the problem is associated with a particular area of the printer.
- Worn separation pads on the multi-purpose tray cause multifeeds. Check the condition of the pickup rollers and customer replaceable feed roller. Bent separation tabs cause misfeeds and multifeeds. Replace the tray if necessary.
- Defective paper tray switches can cause paper jams by indicating the wrong size paper to the formatter.
- Scraps of paper left in the paper path can cause intermittent paper jams. Always check that the paper path is clear when cleaning the printer and when clearing paper jams. Also, remove the fuser and carefully check it for jammed paper.
- Scraps of paper may be difficult to find in the following areas.
  - The ITB drawer connector on the engine side
  - The OHT sensor under the registration plate
  - The fuser (Remove the fuser and check it carefully.)
  - The web transport (Paper scrapes are sometimes found in the center of the web transport before the fuser.)

Print media checklist

Many print problems are caused by printing on media that does not meet specifications. See “Supported media weights and sizes” on page 80 and the *HP LaserJet Printer Family Paper Specification Guide* for detailed information about media specifications. In addition, the following list helps to quickly check common media-related printing problems.

- Rough paper causes poor transfer and smeared print problems. Check that the paper meets specifications for smoothness.
- The printer handles only 60 to 159g/m^2 (16 to 42-pound) bond media, and 0.13 mm (5-mil) thick transparencies.
- Paper that has absorbed moisture causes paper feed problems. If the printer is used in a humid area, suspect damp paper as a cause of recurring paper feed and print quality problems.
- Damaged paper, paper with ragged edges, or paper whose edges stick together cause paper jams.
- Using paper that has already been through a laser printer or a copier could cause paper jams.

CAUTION

Using media that does not conform to the specifications listed here or in the *HP LaserJet Family Paper Specification Guide* can cause problems that require service. This service is not covered by the Hewlett-Packard warranty or service agreements.

2 Service tools

Overview

This chapter provides information on service tools that service personnel can use to verify and manipulate internal printer settings and diagnostics.

Note

Only authorized service personnel should use the service mode.

Cold Reset

Cold reset clears all data from the print buffer and returns the printing menu and the configuration menu to the factory default settings.

To perform a cold reset

Select RESTORE FACTORY DEFAULTS from the Reset menu.

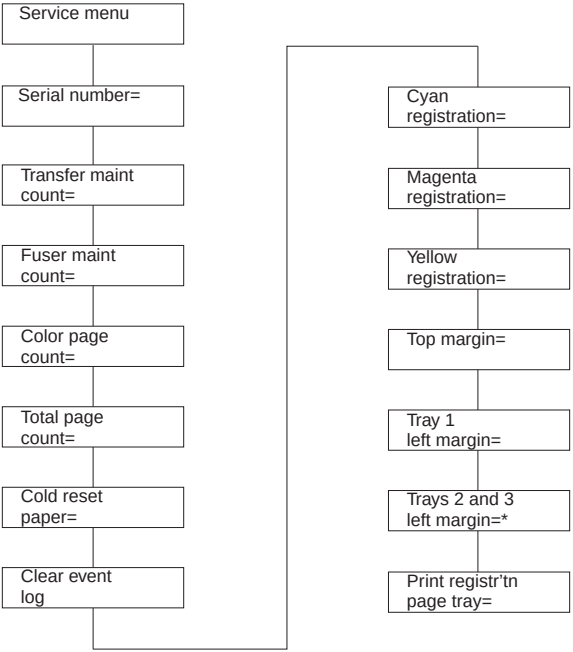
Service mode

Service mode allows for the modification of page counts and certain registration values for the printer. When the configuration page is printed while in service mode, all event log messages are printed as well. If both the formatter and DC controller are replaced at the same time, service mode will need to be utilized to execute the color plane registration sequence to ensure optimum print quality.

To access service mode

1. Hold down the CANCEL JOB key and SELECT key while turning the printer on until the display is blank and the 3 LEDs are on.
2. Press the right side of the MENU key, and then press the SELECT key.

   Service mode will be displayed on the front panel briefly followed by two rows of asterisks. The printer will go through its normal start up cycle then display SERVICE MODE on the front panel.
3. Press the MENU key to access the Service menu.



Service mode menu map

Service menu items

The Service menu provides the options listed below. Press the ITEM key to scroll through the Service menu.

- Serial number
- Transfer maintenance count
- Fuser maintenance count
- Color page count
- Total page count
- Clear event log (see page 76)
- Registration page (see page 51)
- Diagnostics mode (see page 55)
- Paper path test (see page 58)
- Developer test (see page 59)
- Drum test (see page 59)
- Door sensor test (see page 62)
- Formatter diagnostics (see page 56)
- Engine test (see page 63)

See the page number referenced opposite the item for more details.

Registration page

Note

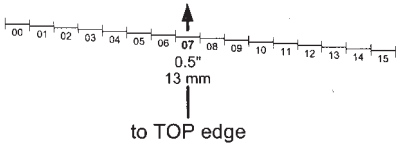
You must set the registration values if both the formatter and DC controller are replaced at the same time or if the formatter was previously installed in another printer. If the DC controller is replaced by itself, these values are copied from the formatter to the DC controller. If a new formatter is replaced, or if an NVRAM initialization is performed (see page 64), these values are loaded onto the formatter from the DC controller.

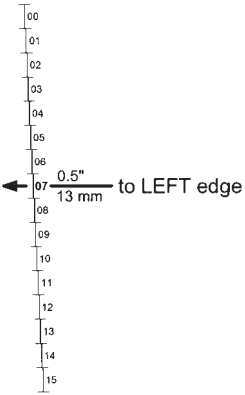
Printing a registration page

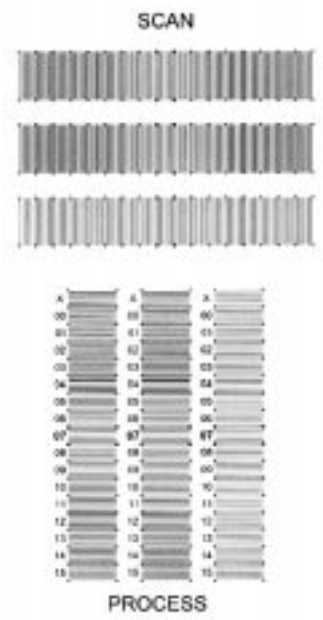
1 Scroll through the Service menu until `PRINT REGISTRATION PAGE` is displayed.

2 Select the paper tray to pull paper from (only when setting left side margins will the tray actually matter).

3 Press **SELECT** to print the registration page.







Registration page

Setting registration numbers

On each of the color bars in the process section are bolded numbers that indicate the current number set on the control panel. These bolded numbers will always be in the middle of the bars. To set the correct value for each of the colors, look at the lines within the bar and find the grouping that has the color line directly on top of the black line (it will have more white space). Print at least five registration pages to see if the new settings are correct.

Note

Using a magnifying glass to look at the lines will help in selecting the best number.

Setting the registration number:

1. Use the **ITEM** key to select the appropriate color (cyan, magenta, or yellow) to view or change its registration number.
2. Press the **+ VALUE -** key to change the registration number to the one identified.
3. Press the **SELECT** key to enter the value.

Setting margin numbers

The top margin number is not tray dependent like the left side margin. You can print the registration page from whichever tray has paper. Using a ruler, measure from the top edge of the paper to the series of lines. Find the line that is 13 mm (0.5 in) away from the edge of the paper.

Setting the top margin registration value:

1. Press the **ITEM** key to scroll through the Service menu until top margin is displayed.
2. Press the **+ MENU -** key until the number to be entered is displayed.
3. Press the **SELECT** key to enter the number.

Print another registration page and the number just entered will align with the arrow and be bolded.

The left-side margin setting is tray dependent. Tray 1 has its own number while Trays 2 and 3 are combined. The procedure is the same as the top margin with one exception. The page must be printed from the tray that will be adjusted.

Printing from Tray 1:

1. Press the **ITEM** key until `PRINT REGISTRATION PAGE TRAY = 1` (default) is displayed.
2. Press the **SELECT** key.
3. Measure from the left side of the paper to the lines and find the line that is 13 mm (0.5 in) from the edge of the paper.

If the number for the line is different then the current number:

1. Press the **ITEM** key until `TRAY 1 LEFT MARGIN = #` is displayed.
2. Press the **+ VALUE -** key to change the number to the number required.
3. Press the **SELECT** key.

Printing from Tray 2 and 3:

1. Press the **ITEM** key until `PRINT REGISTRATION PAGE TRAY = 2` or `3` is displayed.
2. Press the **SELECT** key.
3. Measure from the left side of the paper to the lines and find the line that is 13 mm (0.5 in) from the edge of the paper.

If the number for the line is different then the current number:

1. Press the **ITEM** key until `TRAY 2 AND 3 LEFT MARGIN = #` is displayed.
2. Press the **+ VALUE -** key to change the number to the number required.
3. Press the **SELECT** key.

Diagnostics mode

This section provides an overview of the diagnostic tools incorporated into the HP Color LaserJet 4500/4500 N/4500 DN printer.

CAUTION

Use caution when performing printer diagnostics to avoid risk of injury. Only trained service personnel should access the diagnostic mode with the skins removed.

There are two diagnostic sections built into the firmware, one for the formatter and the other for the engine. Each section contains different tests that allow the service technician to verify printer functionality. While in diagnostic mode there are no error messages associated with these tests. Therefore, determination of the problem will rely on the technicians skill. To exit diagnostic mode, turn the printer off.

Accessing diagnostics

- To access the diagnostics mode, hold down the **ITEM** key and turn on the printer.

Formatter diagnostics

Formatter diagnostics are designed to be used by qualified service personnel. This set of tests are designed to thoroughly test the functionality of the formatter. If all the tests pass, the formatter is working correctly and it is likely that the problem resides elsewhere. Listed below are descriptions of the formatter tests available.

CAUTION

NVRAM can be lost if the printer is turned off during testing.

Formatter diagnostics

Test	Description
REPEAT	If set to yes, the tests will run continuously until interrupted
ON FAULT	The following will occur for each setting: BREAK – the test will stop when a failure occurs PAUSE – stops the test for a short period of time then resume with the remaining tests CONT – continues to execute the tests even when a failure occurs
ROM CRC	Tests the firmware ROM for correct functionality
DRAM	Tests the on-board RAM and the DIMMs
SRAM 1	Tests the SRAM inside the ASIC
SRAM 2	Tests the SRAM physically mounted on the formatter
NVRAM	Tests the formatter NVRAM. This test takes 15 minutes to run and should only be used when NVRAM values are being lost. In almost all cases, this test should never be run
EXECUTE TESTS	Runs the selected tests

Engine diagnostics

A good understanding of how the printer operates is required to use the engine diagnostics successfully.

To have a better view of the areas being exercised, remove the left-side cover and the ITB drawer. Defeat the two ITB drawer switches located on the left side of the drawer cavity.

Listed below are the diagnostics available and a brief description of what the diagnostic will do.

Engine diagnostics

Menu item	Selectable value	Description
Continuous	N (default)	Selected test runs once.
	Y	Selected test runs in a continuous loop.
Paper Path Test		Turns on the motors that control the paper path section of the printer.
Developer Test		Rotates the carousel and the developers.
Drum Test		Turns on the drum drive motor that drives the drum and ITB.
Path Sensors		Displays the state for each of the paper path sensors and switches.
Door Sensors		Displays the state for each of the door and drawer switches.

Paper path test

Note

If an error occurs during the paper path test, the message PATH_1PAPER PATH TEST FAILED displays.

1. Press the **ITEM** key until you see ENGINE DIAGS PAPER PATH TEST.
2. Press the **SELECT** key to activate the test. While the test is running ENGINE DIAGS E1:PAPERPATH displays in the front panel.

The test takes approximately 15 seconds to run.

Components exercised by the paper path test include the fusing motor (M1), paper path motor (M2), and associated gears and assemblies. The paper pick roller for tray 2 can be activated by manually activating the paper pick solenoid (SL2). This test will not pick paper and move it through the paper path. To test this function, run a configuration page. For multiple pages, select CONTINUOUS CONFIGURATION PAGE in the control panel.

The paper path test allows the service technician to verify the operation of components within the paper path. When the test is initiated, both M1 and M2 are activated. You will see the ITB lift cams rotate once and the ITB drive gear turn briefly. The remaining portion of the test allows both M1and M2 to run, thus exercising the associated gears and rollers.

Developer test

The developer test rotates the carousel stopping at each toner cartridge and rotating the developer sleeve. For the best view of the carousel and the toner cartridge sleeves, remove the drum cartridge. The drum drawer must be closed before the test can run.

1 Press the **ITEM** key until `ENGINE DIAGS DEVELOPER TEST` is displayed.

2 Press the **SELECT** key to run the test. The front panel displays `ENGINE DIAGS E2:DEVELOPER` while the test is running. Watch the carousel and make sure that the toner cartridge developer sleeve rotates. The sequence is black followed by a pause, then magenta, cyan, and finally yellow.

The test takes approximately 35 seconds. While the developer test is running you will see the drum turn if it is installed, as well as the drive gear for the ITB.

Drum test

The drum test exercises the drum drive mechanism. In addition, the fuser motor is turned on to allow the lift cams for the ITB to be rotated into the ITB up position.

1 Press the **ITEM** key until `ENGINE DIAGS DRUM TEST` displays.

2 Press the **SELECT** key to run the test. The front panel displays `ENGINE DIAGS E3:DRUM` while the test is running.

Watch to see if the ITB lift cams turn and if both the drum drive gear and the ITB drive gear is rotating

Path sensors

The path sensors test allows the paper path sensors and switches to be tested for correct operation. The table below shows the correlation between the identifier on the front panel and the sensor or switch it represents.

Paper path sensors and switches

Identifier	Name	Description
A	PS8	Tray 2 paper detect sensor
B	PS3	Tray 1 last piece of media pulled sensor
C	PS4	Tray 1 paper detect sensor
D	SW801	Tray 2 paper size switch 2
E	SW802	Tray 2 paper size switch 1
F	SW803	Tray 2 paper size switch 0
G	PS3001	Optional Tray 3 paper detect sensor
H	SW3001	Optional Tray 3 paper size switch 2
I	SW3002	Optional Tray 3 paper size switch 1
J	SW3003	Optional Tray 3 paper size switch 0
K	PS10	Carousel position sensor
L	PS11	N/A
M	N/A	500-sheet feeder: 1=installed, 0=uninstalled
N	PS9	Top output tray full sensor

1 Press the **ITEM** key until `ENGINE DIAGS PATH SENSORS` is displayed on the front panel.

2 Press the **SELECT** key to activate the test. The front panel will display A through N with a binary value below it.

When running this test, make sure the ITB drawer is installed with Tray 2 and Tray 3 (if installed) removed. In this state, the default value on the front panel should be: 0X111111110010, where the x can be either Ø or 1. If there is any other value, then there is a possible problem. Identify the sensor or switch in the table above and test to see if the value changes. Cassette paper-size settings for each tray are described in the table below.

Paper-size settings

Paper Size	Tray 2 switches (DEF)	Tray 3 switches (HIJ)
A4	000	000
B5	001	001
Custom (A5)	010	011*
Custom (B5 ISO)	011	011*
Letter	100	100
Executive	101	101
Legal	110	110
No tray installed	111	111

* These values are the same for tray 3.

Door sensor test

The door sensor test allows service personnel to open and close doors on the printer while watching the sensor status on the front panel. Switches 4 and 5 are in series with each other, which causes the value to toggle under identifier A.

Once the door sensor test is initiated, the front panel displays the status for each sensor listed in the table below. As a door is opened and closed, the state of the sensor changes the indicator values on the front panel.

Sensor status

Identifier	Name	Description
A	SW4 and SW5	Front and rear door switches
B	SW1 *	ITB drawer switch
C	SW2 *	Toner cartridge door *
D	SW3 *	Drum drawer switch *
E	Drum detect	Detect if a drum cartridge is installed
F	Fuser	Detects if fuser is installed. Changes the state of the sensor if not detected or removed when rear door is opened and closed.

* Activates (A) when opened.

1 Press the **ITEM** key until `ENGINE DIAGS DOOR SENSORS` is displayed on the front panel.

2 Press the **SELECT** key to activate the test.

The front panel displays A through F with a binary value below it. All the doors and drawers should be closed. In this state, the display will show all Ø's. Open the doors and drawers one at a time to verify correct functionality. If operating correctly, the Ø will change to a 1. If a 1 is displayed with all doors and drawers closed; there is a bad switch or connection.

Engine test

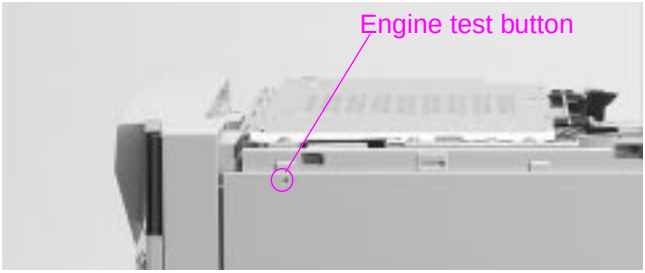
The printer has one test pattern (vertical lines). When an image defect appears, a test print can be made to identify the problem. The test print can be made by pressing the test print switch located on the right side of the printer (see figure below). A test pattern can be printed by pressing the test print switch once after the photosensitive drum has stopped and the printer has entered the standby mode. If the switch is held down, the test pattern is printed continuously. The switch can be used when paper is loaded in any tray other than Tray 1.

The engine test does the following:

- Verifies that the print engine is functioning correctly (the formatter PCB is completely bypassed during an engine test).
- Isolates printer problems
- Checks and adjusts registration
- Prints from Tray 2 or 3 only, not from Tray 1
- Can be activated with the formatter PCB removed

Note

For the printer to perform an engine test, Tray 2 or Tray 3 must be installed and loaded with paper, and the toner cartridges must be installed in the printer.



Location of the engine test button

NVRAM initialization

NVRAM initialization should always be executed immediately after replacing the firmware or the formatter board. This procedure aligns the firmware with the formatter. Not performing NVRAM initialization could result in deterioration of print quality. Before initializing NVRAM, be sure to gather and write down the information listed below, if possible.

- Total page count and color page count
  - Print a configuration page to obtain both page counts and the serial number.
- Percentage of life remaining for both the transfer kit and the fuser kit
  - **A** From `SERVICE MODE` on the printer display panel, press **MENU**.
  - **B** Go to `SERVICE MENU` and press **ITEM**.
  - **C** Use the **VALUE +/-** keys to go to `TRANSFER MAINT COUNT=XXXXXXX` and write down the exact numbers shown.
  - **D** Go to `FUSER MAINT COUNT=XXXXXXX` and write down the exact numbers shown.
- Serial number

To initialize NVRAM

1. Hold down both the **CANCEL JOB** and **SELECT** keys until all the LED lights are on, then release the keys.
2. Press **CANCEL JOB**.
3. Press **SELECT**.

After replacing the firmware or the formatter board, the following settings are changed or lost. If you do not wish to accept the new values, use Service Mode to enter the previous settings that you wrote down prior to initializing.

- Total page count and total color page count (the counter is reset to Ø)
- Transfer kit percentage of life remaining (gauge is reset to 100%)
- Fuser kit percentage of life remaining (gauge is reset to 100%)
- Printer serial number

3 Power supply

Overview

Three power supplies are used to power various sections of the printer: AC, DC, and a high-voltage power supply. This chapter details the distribution of these power supplies.

AC/DC power supply

The low-voltage power supply circuit supplies +24 Vdc and +5 Vdc, which is required for the printer, and 3.3 and 5 Vdc, which is required for the video controller.

+24 Vdc

- The paper pickup motor, scanner motor, and high-voltage power supply PCB use +24 Vdc.
- The front door switch or the rear door switch is deactivated by opening the drum cartridge drawer, ITB unit drawer, toner cartridge door, or delivery door. These switches are in series and disable the 24 Vdc when open.

+5 Vdc

- The sensors and the ICs on the DC controller PCB use +5 Vdc.
- The low-voltage power supply circuit monitors the 5 VS (volt signal) fed back from the connector PCB to ensure the 5 V power supply to the formatter.

+3.3 Vdc

- Formatter PCA
- DIMM
- EIO PCA

Overcurrent/overvoltage protection

Each DC power supply circuit has an overcurrent protective function and overvoltage protective function. This prevents a power supply circuit failure by automatically interrupting the output voltage when anomalies such as a short develop on the loads that result in overcurrent flow or abnormal voltage.

Note

Protective functions remain active for 2 minutes after activation. Wait for at least 2 minutes to turn the power back on again.

If this function is activated and no DC voltage is output from the low-voltage power supply circuit:

1. Turn off the power switch (SW6).
2. Unplug the power cord.
3. Resolve the anomaly on the load.
4. Turn the power switch (SW6) on again.

High-voltage power supply

The printer contains two high-voltage PCBs mounted in one assembly. Together these PCBs generate the voltage supplied to the following:

- primary charging roller
- developing sleeve
- primary transfer roller
- secondary transfer roller
- ITB cleaning roller
- upper fusing roller

DC voltage or a superimposed AC voltage and DC voltage is applied to the primary charging roller, developing sleeve, and ITB cleaning roller.

Positive or negative DC voltage is applied to the primary transfer roller and secondary transfer roller. Negative DC voltage is applied to the upper fusing roller.

Protection systems

Problems on the load side, such as short-circuits, can cause an excessive flow of current from the DC power supplies or can generate abnormal voltage. When this happens, the excess-current and excess-voltage protection systems automatically shut off output voltage to protect the power supplies.

If the protection systems are activated and the power supply circuit does not output DC voltage, turn the printer off, correct the problem in the faulty load, and then turn the printer on again.

4 Input/Output (I/O)

Overview

This chapter provides information on cabling and the printer interface.

Enhanced I/O (EIO) configuration

The 4500 series printers come equipped with two enhanced input/output (EIO) slots. These slots hold compatible external devices such as the HP JetDirect 600N Print Server. Plugging EIO cards into the slots increases the number of network interfaces available to the printer.

EIO cards can maximize printer performance when you are printing from a network. In addition, they provide the ability to place the printer anywhere on a network. This eliminates the need to attach the printer directly to a server or a workstation and enables you to place the printer closer to your network users.

The printer control panel will have an additional menu (EIO Menu) if the printer is configured with EIO cards. (See the chapter on using the printer control panel in the online user guide.)

Note

Installation of cards and network configuration should be performed by a network administrator.

HP JetDirect print servers

HP JetDirect print servers (network cards) can be installed in one of the printer EIO slots. These cards support multiple network protocols and operating systems. HP JetDirect print servers facilitate network management by allowing you to connect a printer directly to your network at any location. HP JetDirect print servers also support the Simple Network Management Protocol (SNMP), which provides network managers with remote printer management and troubleshooting through HP JetAdmin software.

LocalTalk I/O

The LocalTalk interface enables you to print directly from a stand-alone Apple Macintosh computer or from a Macintosh computer on a LocalTalk network. For specific information on configuring your computer and printer to print through a LocalTalk interface, refer to the printer's getting started guide and the *HP JetDirect Print Server Software Installation Guide.*

CPU

The formatter PCB incorporates a 133MHz RISC processor.

Bidirectional parallel interface

The formatter PCA receives incoming data through its bidirectional interface (IEEE-1284).

The bidirectional parallel interface (IEEE-1284 compliant) is compatible with Centronics parallel interfaces. To take advantage of its enhanced capabilities, such as bidirectional communication, the following must be provided:

- Software application support for these features
- An IEEE-1284 compliant parallel cable with the correct pin configuration (see the following table)

The user may configure the HIGH SPEED item in the Control Panel menu. The default setting, YES, allows the I/O to run at the higher speeds supported by most newer computers. When set to NO, the parallel interface runs at the slower mode that is compatible for older computers. The user may also configure the ADVANCED FUNCTIONS item. The default setting, ON, allows for two-way parallel communications. The OFF mode disables this advanced functionality.

Parallel cable pin configuration

Use the following table to verify the correct pin configuration.

Signal name	Printer pin #	Computer port #
nSTROBE	15	1
DATA Ø	6	2
DATA 1	7	3
DATA 2	8	4
DATA 3	9	5
DATA 4	10	6
DATA 5	11	7
DATA 6	12	8
DATA 7	13	9
nACKNLG	3	10
BUSY	1	11
CALL (PE)	5	12
SELECT	2	13
NAutoFd	17	14
Ø Vdc (GND)	19 – 35	18 – 25
nFAULT	4	15
nSe/In	16	17
nINIT	14	16
PERIPHLH	36	
N.C.	18	

IEEE-1284 compliant parallel cables

HP helped develop the IEEE-1284 standard and is one of the first companies to introduce products that are compliant with it. HP offers the following IEEE-1284 compliant parallel cables. Each is described below.

Part number	Length	Connector type
C2946A	3 meters (10 feet)	Host A to printer C (small) connector
C2947A	10 meters (33 feet)	Host A to printer C (small) connector

Maximum I/O cable lengths

Cable type	Length
Parallel (non-IEEE-1284)	3 meters (10 feet)
Parallel (IEEE-1284) with “C” type connector	10 meters (33 feet)

Configuring the computer interface

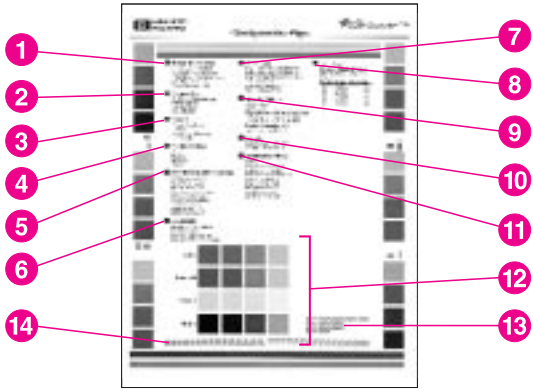
You can verify that the printer is configured properly by printing out a printer configuration page.

Note

If the printer is configured with EIO cards (for example, an HP JetDirect print server), an additional configuration page will print that provides interface configuration information.

Interpreting the printer configuration page

The following sample illustrates a printer configuration page.



Printer configuration page

1 **Printer information**—Lists the printer serial number, PCL/PS firmware revision, total number of pages printed during the life of the printer, and total number of color pages printed during the life of the printer.

2 **Consumables:% of life remaining**—Lists the percentage of the estimated remaining life for the transfer kit, fuser kit, and the drum kit.

3 **Security**—Shows whether the printer control panel is locked or unlocked. Also shows whether the printer control panel password is enabled or disabled.

4 **Density settings**—Lists the current density settings.

5 **Configuration menu**—Lists the current settings of the configuration menu items.

6 **I/O menu**—Lists the current settings of the I/O menu items.

7 **Paper trays**—Lists the size and type of media currently configured for each input tray. Also lists the current Tray 1 mode, A4/letter override setting, and default size setting

8 **Event log**—Lists the last five printer events, including printer jams, service errors, and other printer conditions. If printed while in service mode, all events (up to 50) are printed.

9 **Installed options**—Lists installed options such as EIO cards, DIMMs, duplex unit, and 500-sheet paper feeder.

10 **Memory**—Shows the total memory installed and the total memory available in the printer. Also lists the memory allocation settings.

11 **Printing menu**—Lists the current settings of the printing menu items.

12 **Color blocks**—The color blocks verify color printing ability of the printer. The color blocks in the middle of the page are primary colors, and the color blocks surrounding the page are secondary colors. Each color is shown in 100%, 75%, 50%, and 25% fill.

13 Printer usage information—shows the number of pages printed for the following items:

Row 1: Paper size					
000000	000000	000000	000000	000000	
Custom	Envelope	Legal	Executive/ B5	Letter/A4	
Row 2: Fuse modes					
000000	000000	000000	000000	000000	
Normal	Heavy	OHT	Gloss	Envelope	
Row 3: Source tray					
000000	000000	000000	000000		
Tray 1	Tray 2	Tray 3	Duplex		
Row 4: Language					
000000	000000	000000			
PCL pages	PS pages	XL pages			
Row 5: Media types					
000000	000000	000000	000000	000000	000000
Plain	Pre-printed	Letterhead	Transpar-ency	Pre-punched	Labels
Row 6: Media types					
000000	000000	000000	000000	000000	000000
Bond	Recycled	Color	Card	Gloss	Heavy

Note

For rows one to three, the page count is incremented after every ten pages. Row four is incremented after every end of page. Rows one to four are counted through the engine. Rows five and six are driver requests.

The tray count is incremented based on the tray that is selected by the firmware, not the tray that is selected by the user.

Media size count is incremented based on the media size that is selected by the user. Media type count is incremented based on 1) the media type that is selected by the user when the media is pulled from tray 1; and 2) the media type configured on the tray when media is pulled from tray 2 or tray 3.

Fuser mode count is incremented twice for duplexed sheets, once when the front side is fused and once when the back side is fused.

14 **Calibration density settings**—On the bottom row of text, there are four separate blocks of numbers. The first block is for cyan, second for magenta, third for yellow, and the last is for black. Make sure the numbers are not near zero (if so, no calibration was done).

Note

Do not print the configuration page until the printer is ready or calibration will not occur.

5 Media specifications

Overview

Use media that meet the specifications listed on the following pages. By doing so, you will minimize the incidents of paper jams, prevent premature wear to the printer, and reduce repair costs. Hewlett-Packard recommends testing print media before buying it in large quantities.

Note

For complete paper specifications for all LaserJet printers, see the *HP LaserJet Printer Family Paper Specification Guide*.

Supported media weights and sizes

The table below shows the media types and sizes supported by the printer and the printer accessories. For optimum results, use conventional 75 g/m^2 (20 lb) xerographic paper.

Supported media specifications

Tray	Supported media	Media specifications	Capacity
Tray 1	Paper A4/Letter Legal Executive JIS B5 A5 Custom Minimum Size: 76 x 127 mm (3 x 5 in) Maximum Size: 216 x 356 mm (8.5 x 14)	Single-sided: If less than or equal to 148 mm width: 60 to 176 g/m^2 (16 to 47 lb) If more than or equal to 148 mm width: 60 to 176 g/m^2 (16 to 36 lb) Two-sided: 64 to 105 g/m^2 (17 to 28 lb)	150 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper Letter/A4	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 Limit of 50 sheets
	Envelopes (Tray 1 only) Com10 Monarch C5 DL B5 (JIS)	Maximum weight: 90 g/m^2 (24 lb)	Limit of 10
	Labels (Tray 1 only)		Limit of 50
	Cardstock (Postcards) (Tray 1 only)	Maximum weight: 176 g/m^2 (47 lb) Maximum size: 200 mm x 148 mm (7.87 in x 5.82 in)	Do not load more than the maximum stack height of 15 mm (0.6 in)

Supported media specifications (continued)

Tray	Supported media	Media specifications	Capacity
Tray 2*	Paper A4/Letter Legal Executive JIS B5 A5 Custom (B5 ISO)**	60 to 105 g/m^2 (16 to 28 lb)	250 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 transparencies Limit of 200 sheets glossy
Tray 3* (optional)	Paper A4/Letter Legal Executive JIS B5 Custom (B5 ISO)**	60 to 105 g/m^2 (16 to 28 lb)	500 sheets of 75 g/m^2 (20 lb) paper
	Transparencies Glossy Paper	0.13 mm (5 mil) 120 g/m^2 (32 lb/80 lb text)	Limit of 50 transparencies Limit of 500 sheets glossy
Duplex printing accessory (optional)	Paper A4/Letter Legal Executive JIS B5	64 to 105 g/m^2 (17 to 28 lb)	

*Trays 2 and 3 do not support the range of custom sizes available in Tray 1.
**Trays 2 and 3 use “custom” size—specifically for B5 ISO.

Note

Use only HP-supported transparencies (HP part number C2934A, letter size; C2936A, A4 size)

Media requirements

Selecting print media

You can use many types of paper and other print media with the HP Color LaserJet printers. This section provides guidelines and specifications for selecting and using different print media.

For optimum results, use conventional 75 g/m^2 (20 lb) xerographic paper. Verify that the paper is of good quality and is free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges. See “Supported media weights and sizes” on page 80.

Before purchasing any media or specialized forms in quantity, verify that your paper supplier obtains and understands the print media requirements specified in the *HP LaserJet Family Paper Specification Guide*. The guide is available through HP Direct. (See “Services and support resources” in Chapter 11.) You will want to make sure that your paper meets the following specifications:

Electrical surface resistivity	2.0 to 15 by 10^{10} ohms/square inch (conditioned at 23 C and 50% RH)
Electrical volume resistivity	1.2 to 15 by 10^{11} ohms/square inch (conditioned at 23 C and 50% RH)

It is possible that media could meet all of the guidelines in this chapter and still not print satisfactorily. This may be due to abnormal characteristics of the printing environment or to other variables over which Hewlett-Packard has no control (for example, extremes in temperature and humidity).

Hewlett-Packard recommends testing any media before buying it in large quantities.

CAUTION

Using media that does not conform to the specifications listed here or in the *HP LaserJet Family Paper Specification Guide* can cause problems that require service. This service is not covered by the Hewlett-Packard warranty or service agreements.

Non-supported media

Use the following guidelines to avoid poor print quality or damage to your printer:

- Do not use paper that is too rough.
- Do not use paper that is embossed or coated unless it is specifically recommended for use in the HP Color LaserJet printers.
- Do not use paper with cutouts or perforations other than standard 3-hole punched paper.
- Do not use multipart forms.
- Do not use paper with irregularities such as tabs or staples.
- Do not use letterhead paper with low temperature dyes or thermography. Preprinted forms or letterhead must use inks that can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Do not use any media that produces hazardous emissions, or that melts, offsets, or discolors when exposed to 190° C (374° F) for 0.1 second.
- Do not use paper that has already been printed on or fed through a photocopier or printer.
- Do not use paper with a watermark if you are printing solid patterns.
- Do not duplex on glossy paper. Doing so will result in paper jams and print quality problems.

Printing on special media

Use these guidelines when printing on special types of media.

For optimum results, use conventional 75 g/m^2 (20 lb) xerographic paper. Verify that the paper is of good quality and is free of cuts, nicks, tears, spots, loose particles, dust, wrinkles, curls, or bent edges.

Transparencies

Note

Hewlett-Packard recommends using HP Color LaserJet Transparencies with this printer. HP products are designed to work together for optimum printing results.

When printing on transparencies, use these tips to prevent printer malfunctions caused by transparencies:

- Use letter-size and A-4 size for printing.
- Do not send transparencies from Tray 2 to the rear output bin. The toner will be warm and may cause the transparencies to stick together.
- Send transparencies to the top output bin.
- Handle transparencies using the edges. Oils from your fingers can remain on the transparency and can cause print quality problems.
- Use transparencies with the correct resistivity.
- Use transparencies that meet HP specifications for fusing compatibility.
- Use only overhead transparencies recommended for use in this printer. The following table gives the recommended specifications for transparencies.

Printing on transparencies

Description	Specifications
Electrical surface Resistivity	2.0 to 15 x 10 ohms per square inch
Fusing compatibility	Materials must not discolor, melt, offset, or release hazardous emissions when heated to 190° C (374° F) for 0.1 second.
Caliper (thickness)	0.12 mm (0.0048 in) to 0.13 mm (0.0052 in)

Glossy paper

For optimum results when printing on glossy paper, select the glossy print setting in the printer driver. You can also use the printer control panel to set the media type to GLOSS for the input tray you are using. Because this setting affects all print jobs, it is important to return the printer to its original settings once your job has printed. See the section in the online user guide on configuring input trays.

CAUTION

Do not duplex on glossy paper. Doing so will result in paper jams and print quality problems.

Colored paper

Colored paper should be of the same high quality as white xerographic paper. Pigments used must be able to withstand the printer's fusing temperature of 190° C (374° F) for 0.1 second without deterioration. Do not use paper with a colored coating that was added after the paper was produced.

The printer creates colors by printing patterns of dots, overlaying and varying their spacing to produce various colors. Varying the shade or color of your paper will affect the shades of your printed colors.

Heavy paper

CAUTION

Do not use paper that is heavier than the recommended paper specification for this printer. Doing so can cause misfeeds, paper jams, inferior print quality, and excessive mechanical wear.

Use Tray 1 for paper that is heavier than 105 g/m^2 (28 lb). For optimum results when printing on heavy paper, select the heavy print setting in the printer driver. You can also use the printer control panel to set the media type to HEAVY for the input tray you are using. Because the setting adjustment affects all print jobs, it is important to return the printer to its original settings once your job has printed.

Envelopes

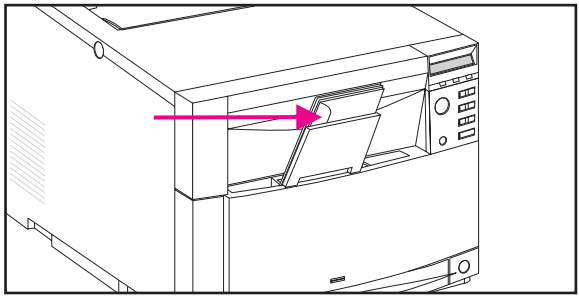
Envelopes can only be printed from Tray 1. For information on loading envelopes, see the section in the online user guide on loading envelopes into Tray 1.

Adhering to the following guidelines will help ensure proper printing of envelopes and help prevent printer jams:

- Do not load more than 10 envelopes into Tray 1.
- The weight rating of envelopes should not exceed 90 g/m^2 (24 lb).
- Envelopes should be flat.
- Envelopes must not be wrinkled, nicked, or otherwise damaged.
- Envelopes with peel-off adhesive strips must use adhesives that can withstand the heat and pressures of the printer's fusing process.
- Envelopes should be loaded with the flaps facing away from the printer and toward the left side of the printer.

CAUTION

To prevent severe printer damage, do not use envelopes that have windows, clasps, snaps, or synthetic materials.



Loading envelopes—envelope flaps at left, face down

Labels

Note

To print labels, Hewlett-Packard recommends configuring Tray 1 as a cassette and setting the tray's media type to LABELS in the printer control panel.

When printing labels, use the following guidelines:

- Verify that the label's adhesive material can tolerate temperatures of 190° C (374° F) for 0.1 second.
- Verify that adhesive material is not exposed between the labels. Exposed areas can cause labels to peel off during printing, which can cause printer jams. Exposed adhesive can also cause damage to printer components.
- Do not re-feed a sheet of labels.
- Verify that labels lie flat.
- Do not use labels that are wrinkled, bubbled, or otherwise damaged.

Preprinted forms and letterhead

Observe the following guidelines for best results with preprinted forms and letterhead:

- Forms and letterhead must be printed with heat-resistant inks that will not melt, vaporize, or release hazardous emissions when subjected to the printer's fusing temperature of approximately 190° C (374° F) for 0.1 second.
- Inks must be non-flammable and should not adversely affect any printer rollers.
- Forms and letterhead should be sealed in a moisture-proof wrapping to prevent changes during storage.
- Before you load preprinted paper such as forms and letterhead, verify that the ink on the paper is dry. During the fusing process, wet ink can come off the preprinted paper.

Recycled paper

This printer supports the use of recycled paper. Recycled paper must meet the same specifications as standard paper (refer to the *HP LaserJet Family Paper Specification Guide*). The guide is available through HP Direct. See Appendix D in the online user guide for ordering information. Hewlett-Packard recommends that recycled paper contain no more than 5 percent groundwood.

Paper curl

Paper curl results from both the heating process used to bond the print image (toner) to the paper and from the path that the paper must negotiate through the printer.

Take the following actions to help reduce paper curl:

1. Turn the paper over in the input tray. Some paper packages (reams) have an arrow indicating the preferred printing side. Experiment to determine which orientation yields the least curl.
2. Try a different output paper path (if available for your printer). Using the face-up output path may yield more acceptable results than the standard face-down output bin.
3. Protect the paper from adverse environmental conditions prior to use. Paper designed for laser printing has an initial moisture content of 4-6 percent, which is maintained as long as it is stored properly. Once the paper has been removed from its packaging it will dry out or absorb additional moisture, depending on the environment. Excess moisture in the paper will increase the amount of curl.
4. Try a different type or brand of paper. Not all paper is designed for laser printing.
5. Heavy toner coverage can result in more curl.

Much of the paper curl that is induced by the laser printer fusing process will tend to relax within the first 24 hours following printing. However, the curl on the leading edge of the page may remain longer because the leading edge tends to remain in contact with the fusing roller for longer periods.

6 Toner cartridge information

Overview

This chapter provides information on toner cartridges and their use. Hewlett-Packard recommends using HP toner cartridges, which are designed specifically to enhance the output from the HP LaserJet family of printers.

Approximate replacement intervals for consumable items

You can identify consumable items by their labeling and their blue plastic handles. For instructions on installing consumables, see the installation guides supplied with each consumable item.

The following table lists the replacement intervals for printer consumable items and the control panel messages that prompt you when it is time to replace each item.

Approximate consumable replacement time

Consumable	Printer message	Page count	Approximate time period
Black (K) toner cartridge	TONER K LOW or TONER K OUT	9,000 pages[1]	4.5 months
Cyan (C) toner cartridge	TONER C LOW or TONER C OUT	6,000 pages[1]	3 months
Magenta (M) toner cartridge	TONER M LOW or TONER M OUT	6,000 pages[1]	3 months
Yellow (Y) toner cartridge	TONER Y LOW or TONER Y OUT	6,000 pages[1]	3 months
Drum kit	DRUM KIT LOW or DRUM KIT OUT REPLACE DRUM KIT	25,000 black and white only pages, or 6,250 color pages.	12.5 months for black and white only pages, or 3 months for color pages.

Approximate consumable replacement time (continued)

Consumable	Printer message	Page count	Approximate time period
Transfer kit	TRANSFER KIT LOW or TRANSFER KIT OUT REPLACE KIT	100,000 black and white only pages, or 25,000 color pages.	50 months for black and white only pages, or 12.5 months for color pages.
Fuser kit	FUSER KIT LOW or FUSER KIT OUT REPLACE KIT	100,000 black and white only pages, or 50,000 color pages.	50 months for black and white only pages, or 25 months for color pages.

1 The approximate average A4/letter-size page count is based on 5% coverage of individual toner colors. Page counts are only estimations; usage conditions and print patterns can cause results to vary.
2 Approximate lives are based on 2,000 pages per month.

CAUTION

Hewlett-Packard recommends the use of HP products in this printer. Use of non-HP products may cause problems requiring service that is not covered by the Hewlett-Packard warranty or service agreements.

Potential toner cartridge issues

Banding

When printing with a laser printer, the toner is applied across the page in horizontal strips. The page is moved through the printer and toner is continually applied. When printing text or black image pages, a large amount of toner is deposited on the page. As the amount of toner deposited on the page decreases, slight speed variations become more apparent. As the resolution (dots per inch) and the speed (pages per minute) increase, a variation in pattern intensity may appear on the page as lines or bands.

The bands are more visible in certain grayscale patterns. High speed printers that are capable of printing high resolution grayscale patterns are more likely to display the pattern variations. Changing the grayscale pattern or reducing the resolution may significantly reduce the amount of banding that occurs.

Character voids

Small gaps or voids may appear in some of the characters when printing on media other than standard photocopier paper. These “character voids” occur because some print media does not accept the transfer of toner as well as others.

To minimize the occurrence of character voids, avoid media with a rough finish. Use media that is within the Hewlett-Packard paper specifications listed in the user guide, service manual, or *HP LaserJet Family Paper Specification Guide*. If the finish is too rough, the surface will consist of large inconsistencies. If the finish is too smooth, toner will not adhere well. Adjusting the print density may affect the severity of character voids.

Toner cracking

When the paper is folded and the crease aligns with a line of text, it is possible with certain types of paper for the text to break along the line, giving the appearance of a white line through the text. Papers that do not meet the smoothness (100-250 Sheffield, 100-500 Bendtsen) or wax pick (>11 Dennison) are likely to exhibit this effect more than others.

Toner in the HP LaserJet printers is composed of minute particles of pigmented plastic material (styrene) and iron oxide. When the toner is subjected to the fusing temperature, these individual iron-impregnated plastic particles become part of a larger plastic image on the page. When the printed page is subsequently folded, the plastic image must also give, in some fashion, to accommodate the fold. If the print image has been well-set into the paper, this resulting break in the plastic will not be apparent. However, if the toner is unable to adequately penetrate the paper fibers or if, in the process of folding the paper, the paper fibers behind the toner break away from the page itself, the result will be a “white line” through the image. There are several ways to minimize this effect:

- Ensure that the paper being used meets all of the specifications provided in the *HP LaserJet Printer Family Paper Specification Guide*; in particular the smoothness and wax pick.
- For the reasons listed earlier, a narrower character-stroke width might also help.

In electrophotographic (laser) printing, using paper that has a laid finish often causes problems. The surface roughness of the paper is often responsible for the problems.

Paper that is stiffer than electrophotographic paper also causes problems. Stiff papers do not fold well. When stiff paper is folded and a toner image is applied to the paper’s surface, the problems are even worse.

Transfer of toner image (post-image transfer)

After printing a document on a HP LaserJet printer, folding it, and sending it through the mail, you might observe that a portion of the print image was transferred to opposing surfaces of the folded document.

The laser printing process uses a pigmented plastic powder (toner) to form a print image that is first transferred to a sheet of paper (or other print medium) and then melted (fused) onto the surface of the paper to form a permanent image. Though paper is usually thought of as being “soft,” it is actually quite abrasive. When the printed page is folded, movement under pressure between a paper surface and the toner image may cause the paper to abrade (scratch) the toner, causing a transfer of the toner material onto the opposing surface of the paper. This can be demonstrated by rubbing a print image against (or into) a clean sheet of paper.

Some machinery, such as that used by the U.S. Postal Service to sort mail, can apply the necessary pressure and agitation to cause this toner image transfer phenomenon.

To minimize this effect:

- Minimize the amount (or height) of toner used to produce the print image.
- Use a paper that is less abrasive.
- Ensure optimal fusing of the toner (print) image to the paper.

HP LaserJet printers have been designed for optimum results with xerographic (laser) bond papers such as HP Multipurpose paper. The properties of this type of paper (for example, surface roughness, composition, and moisture content) are such that the other causes of potential toner transfer are minimized. Photocopy papers are typically less abrasive than other types of paper (such as writing bond) and are also formulated to ensure optimal fusing of the toner image. Using other types of paper will generally yield less than optimal results in laser printers. For help in selecting paper suitable for use in the HP LaserJet printers, refer to the *HP LaserJet Printer Family Paper Specification Guide*. This guide can be ordered by calling HP Parts Direct at (800) 227-8164 in the U.S., or HP Distribution at (970) 339-7009.

Because of the way that laser printing is accomplished, currently there is no way to entirely eliminate the possibility of toner transfer. However, using these techniques should yield results that are more satisfactory and will often reduce the problem to imperceptible levels.

Gray background on envelopes

Poor print quality is normally the result of using envelopes that are of the incorrect weight or finish. The paper used to construct the envelope may be embossed; or may be too heavy, too rough or too slick; or may be made in such a way that it is incompatible with the high temperatures encountered in toner fusing. The result is that the toner does not adhere well to the surface. Also, on heavier envelopes, a gray background may appear on the front (or print side) of the envelope.

HP Planet Partners

The U. S., Canada, Europe, and Australia now have HP toner cartridge recycling programs. The used toner cartridge should be placed in the wrapper and box that held the new cartridge and sent back for recycling.

HP Planet Partners

U.S.	A brochure explaining the recycling program in the U.S., part number 5091-1325EUS, can be ordered. The customer returns used toner cartridges via UPS at no cost to the customer using shipping labels included in the brochure. The toner cartridges can be shipped one at a time or in volume shipments. Some of the parts are recycled to make new cartridges. Other parts are melted for re-use as raw materials. If the customer has any questions, and to receive the free recycling brochure, refer them to the Customer Information Center at (800) 752-0900.
AUSTRALIA	Australian customers can send their toner cartridges to their local HP dealer. If more than 30 cartridges a month are used, contact the local dealer for instructions on how to have the cartridges picked up directly from the customer's site. For further information, contact the dealer or local HP sales office.
EUROPE	The recycling program in Europe currently includes these countries: Germany, Switzerland, Austria, United Kingdom, the Netherlands, and Sweden. If more than 30 cartridges a month are used, contact the local dealer for instructions on how to have the cartridges picked up directly from the customer's site. For further information, contact the dealer or local HP sales office.

HP Planet Partners (continued)

CANADA	Canada uses Federal Express for their recycling program. At least eight but no more than 40 Toner Cartridges can be shipped at one time. Shipments of less than eight cartridges are at the shipper's expense. Call Federal Express at (800) GoFedEx; (800) 463-3339 to arrange for free pickup of the bundled cartridges. Fill out a Federal Express Waybill or obtain a preprinted one from your dealer. In Alberta, B.C., Manitoba, NWT, Saskatchewan, and the Yukon, send the bundles to: Hewlett-Packard Toner Cartridge Recycling Program 6551 Westminister Hwy, Unit 160 Richmond, B.C. V7C 4V4 Acct. No.: 1246-1740-5 In the Atlantic provinces, Ontario, and Quebec send the bundles to: Hewlett-Packard Toner Cartridge Recycling Program 6600 Goreway Drive, Unit C Mississauga, Ontario L4V 1S6 Acct. No.: 1246-1740-5 For more information, call: Canada wide: (800) 387-3867 Dept. 129; Toronto: (800) 678-9430 Ext. 4981

Note

Recycling information is included in the toner cartridge package.

For additional information about HP corporate-wide, environmental policies, practices, and awards, visit **www.hp.com**.

Toner cartridge refill statement

Hewlett-Packard toner cartridges have been designed to maximize the reliability of the HP LaserJet printer by including all of the components that need frequent replacement or adjustment within the cartridge. While we recognize that all parts of this critical printer mechanism will not wear consistently, the HP toner cartridge has been designed to optimize the exceptional print quality that is synonymous with the HP LaserJet printer name. While Hewlett-Packard does not prohibit the use of refilled toner cartridges during the warranty period or under a maintenance contract, we also do not recommend their use for the following reasons:

1 The HP LaserJet toner cartridge is not designed to be refilled or remanufactured.

2 Hewlett-Packard has no control or process to ensure that a refilled toner cartridge will function at the high level of reliability of a new HP LaserJet toner cartridge. Hewlett-Packard also cannot predict what the long-term effect on the printer's reliability could be from using different toner formulations found in refilled cartridges. Because the HP LaserJet printer has the highest reliability reputation in the industry, we are concerned about any usage that might affect this reputation.

3 Hewlett-Packard has no control over the actual print quality of a refilled toner cartridge. The print quality of the HP LaserJet toner cartridge directly influences the customer's perception of the HP LaserJet printer itself. The high print quality of the HP LaserJet printer is one of the primary reasons for the success of the product and we are keenly interested in maintaining that image.

The entire family of HP LaserJet printers is covered under a standard one-year warranty from the date of purchase. Hewlett-Packard offers optional maintenance contracts after the one-year warranty expires. The use of refilled toner cartridges alone does not affect either the warranty or any maintenance contract purchased from HP. **However, if a HP LaserJet printer failure or damage is found to be directly attributed to the use of a refilled toner cartridge, the repair will not be covered under the warranty or by the maintenance contract**. Rather, standard time and material charges will be applied to service the printer for that particular failure or damage.

Hewlett-Packard is constantly striving to provide the highest quality printer products possible. The HP LaserJet printer family was designed for optimum output performance when the printing mechanism is periodically replaced with a new HP toner cartridge. The HP toner cartridge is designed specifically to enhance the output from the HP family of printers. We know that the highest quality print results will be obtained when new HP toner cartridges are used with HP LaserJet printers.

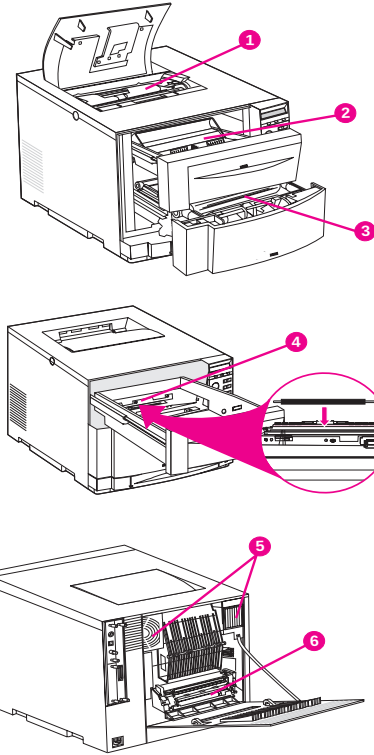
7 Printer options and consumables

Overview

The following tables list the products, product numbers, product descriptions, and service part numbers for each printer. Parts can be ordered through HP Parts Direct Ordering at (800) 227-8164 (U.S. only). For additional product support, see the inside back cover of this guide.

Identifying consumables

The following illustrations show the location of the consumables.



Consumable locations *

1	Toner cartridges	4	Transfer roller
2	Imaging drum cartridge	5	Air filters
3	Intermediate transfer belt	6	Fuser

* See “Approximate replacement intervals for consumable items” on page 92.

Printer options and replaceable parts

Printer options and replaceable parts

Product	Product number	Product description	Service part number
Memory	C4140A	4 MB SDRAM DIMM	C4140-67901
	C4141A	8 MB SDRAM DIMM	C4141-67901
	C4142A	16 MB SDRAM DIMM	C4142-67901
	C4143A	32 MB SDRAM DIMM	C4143-67901
	C3913A	64 MB SDRAM DIMM	C3913-67901
Fonts	N/A	Greek (1 MB)	5062-4667
	N/A	Hebrew (1 MB)	5062-4668
	N/A	Cyrillic (1 MB)	5062-4669
	N/A	Arabic (1 MB)	5062-4670
	C4292A (CAS)	Traditional Chinese (8 MB)	N/A
	C4293A (CAS)	Simplified Chinese (8 MB)	N/A
	YS-90210	Japanese (8 MB)	N/A
Network connectivity	J3110A	HP JetDirect 600N for ethernet (10Base-T [RJ-45])	J3110-60001
	J3111A	HP JetDirect 600N for ethernet (10Base-T [RJ-45] and 10Base-2 [BNC]) and LocalTalk (DIN-8)	J3111-60001
	J3112A	HP JetDirect 600N for Token Ring (DB9, RJ-45)	J3112-60001
	J3113A	HP JetDirect 600N for Fast Ethernet (10/100 Base-TX [RJ-45])	J3113-60001

Printer options and replaceable parts (continued)

Product	Product number	Product description	Service part number
Options	C4082A	500-sheet input tray	C4082-67901
	C4083A	Duplex unit (two-sided printing)	C4083-67901
	C4235A	HP Color LaserJet 4500 cabinet	N/A
Toner supplies	C4191A	Black	R94-4005-410CN
	C4192A	Cyan	R94-4004-410CN
	C4193A	Magenta	R94-4003-410CN
	C4194A	Yellow	R94-4002-410CN
	C4191A	Black (Europe only)	R94-4005-510CN
	C4192A	Cyan (Europe only)	R94-4004-510CN
	C4193A	Magenta (Europe only)	R94-4003-510CN
	C4194A	Yellow (Europe only)	R94-4002-510CN
Consumables	C4195A	Drum kit	R94-4001-410CN
	C4196A	Transfer kit	R96-5009-000CN
	C4197A	Fuser kit (110V)	R96-5007-000CN
	C4198A	Fuser kit (220V)	R96-5008-000CN

Printer options and replaceable parts (continued)

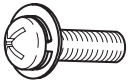
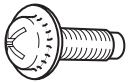
Product	Product number	Product description	Service part number
Panel overlays	N/A	English	C4084-40001
	N/A	German	C4084-40005
	N/A	French	C4084-40003
	N/A	Spanish	C4084-40006
	N/A	Italian	C4084-40004
	N/A	Korean	C4084-40015
	N/A	Simplified Chinese	C4084-40018
	N/A	Traditional Chinese	C4084-40014
	N/A	Swedish	C4084-40011
	N/A	Dutch	C4084-40007
	N/A	Finnish	C4084-40009
	N/A	Russian	C4084-40016
	N/A	Danish	C4084-40008
	N/A	Norwegian	C4084-40010
	N/A	Portuguese	C4084-40012
	N/A	Czech	C4084-40017
	N/A	Polish	C4084-40013
	N/A	Japanese	C4084-40020

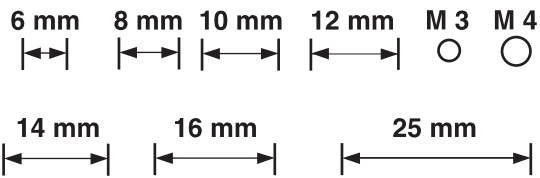
8 Printer parts

Overview

This chapter provides the part numbers and descriptions of the most commonly used assemblies and subassemblies in the HP LaserJet color printers. The shaded numbers in the tables refer to the location of the part in the printer, as shown in the corresponding illustrations.

Common fasteners

Illustration	Description	Size	Uses
	Screw, machine w/washer	M3X6 M3X10 M3X12 M3X14	To hold plastic to metal example: the skins
	Screw, self-tapping	M4X8 M4X10	To hold plastic to plastic example: control panel
	Screw, trus head	M3X4 M3X6 M3X8	Sheet metal to sheet metal example: formatter pan
	Retaining ring (e-type)		To hold gears into place



Parts lists and illustrations

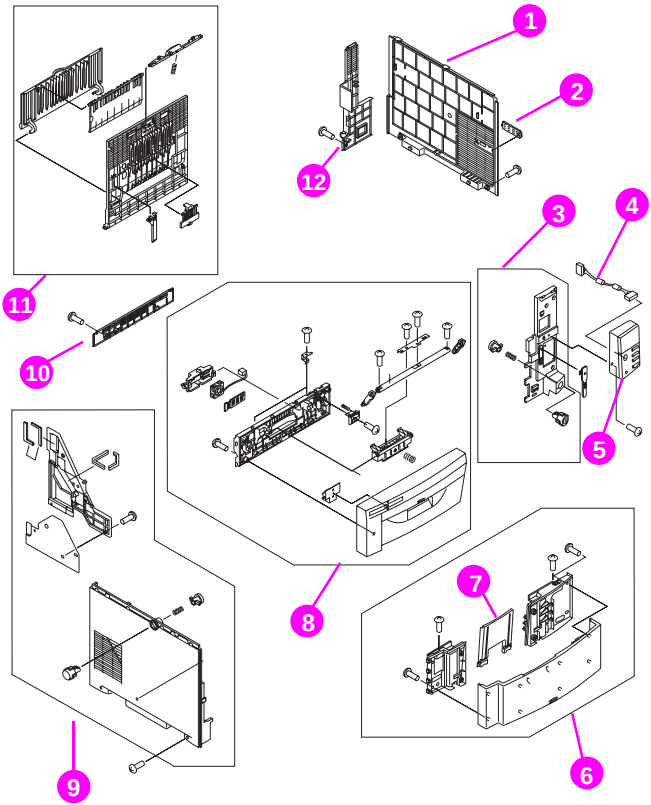
The following illustrations and their respective parts tables list the field replaceable units (FRU) for this printer. Each table includes the name of the part (description), part number, quantity, and reference number pointing to the part and location in the illustration.

See page 134 for a complete list of printer parts (sorted alphabetically by name with part numbers).

Determining the printer version

Two versions of the HP Color LaserJet 4500 series printers are available. To accurately perform removal and replacement procedures or determine the correct part for reordering, you will need to know the version of the printer that is being serviced. To identify the printer, check the serial number, which is located at the rear of the printer. All printers will have US or JP in the first two positions of the serial number (e.g., **US**BB123456). Newer versions of the HP Color LaserJet 4500 printers will have an “H” or higher letter in the third position (e.g. US**H**B123456). If the letter in the third position in the serial number is “B”, “C”,”D”, or “F”, then you have an older version of the HP Color LaserJet 4500 printer.

Parts for the HP LaserJet 4500 series

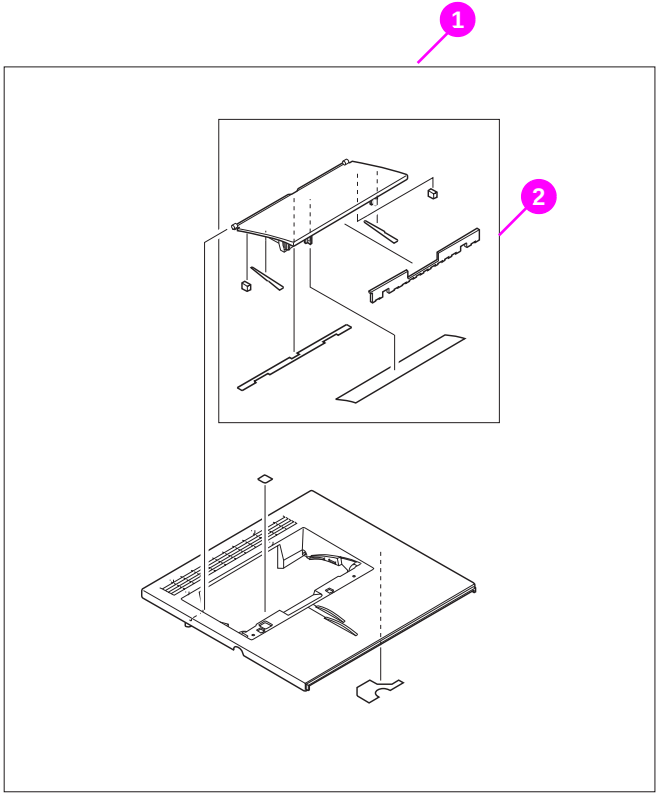


External covers, panels, etc.

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cover, right side	1	RB2-1203-000CN	RB2-1203-000CN
2	Cover, connector	1	RB2-1224-000CN	RB2-1224-000CN
3	Cover, right front	1	RG5-3310-000CN	RG5-3310-000CN
4	Cable, control panel	1	RG5-3802-000CN	RG5-5195-000CN
5	Control panel assembly	1	RG5-3345-000CN	RG5-3345-000CN
6	Cover, ITB drawer	1	RG5-3320-000CN	RG5-3320-000CN
7	Tray, extension	1	RB2-1215-000CN	RB2-1215-000CN
8	Cover, drum drawer	1	RG5-5232-000CN	RG5-5152-000CN
9	Cover, left side	1	RG5-3313-000CN	RG5-5151-000CN
10	Cover, lower rear	1	RB2-1206-000CN	RB2-1206-000CN
11	Door, rear access	1	RG5-3325-040CN	RG5-3325-040CN
12	Cover, rear	1	RB2-1205-000CN	RB2-1205-000CN

CAUTION

Two versions of the HP Color LaserJet 4500 series printers are available. Before ordering parts, you will need to identify which printer version you are servicing. For more information, see page 111.



Top cover assembly

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cover, top	1	RG5-3300-000CN	RG5-5150-000CN
2	Cover, toner access	1	RF5-2076-000CN	RF5-3137-000CN

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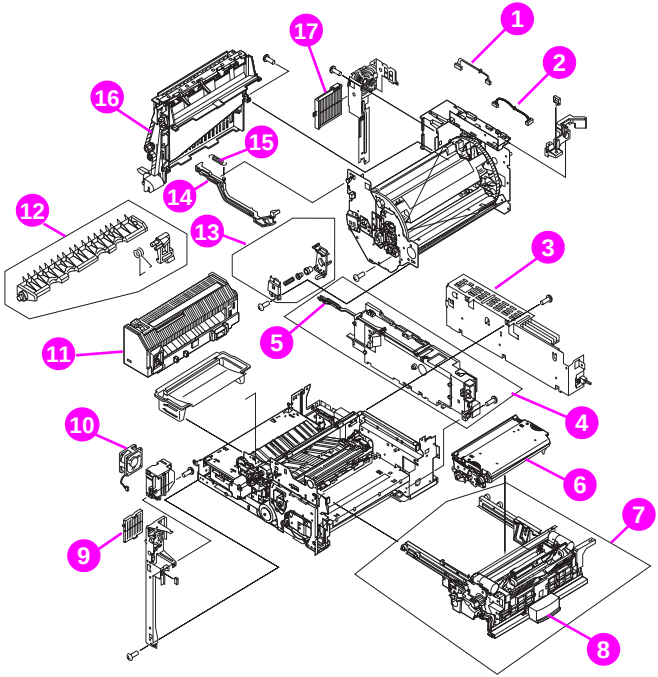


Internal components (1 of 3)

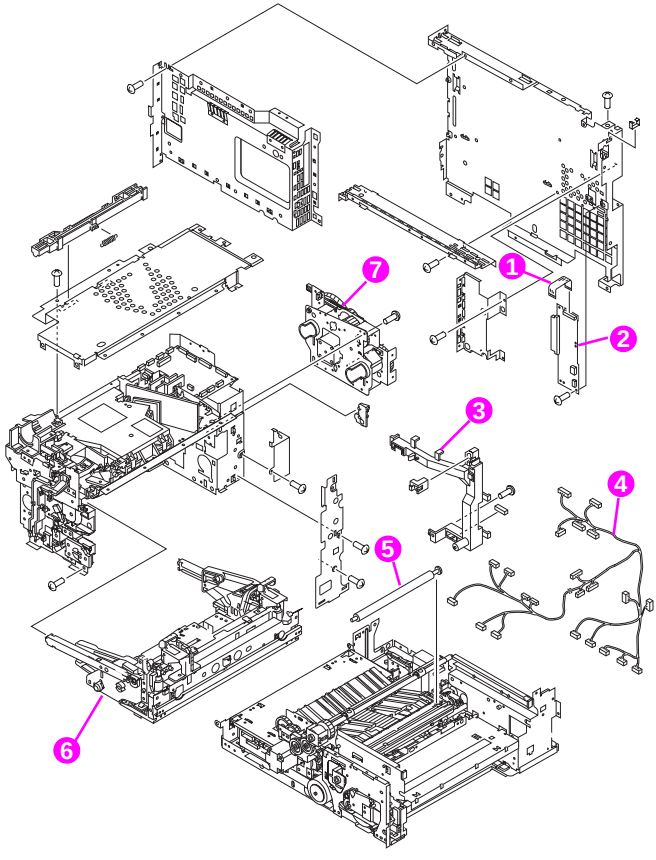
Internal components (1 of 3)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cable, fan	1	RG5-3887-000CN	N/A
2	Cable, developer	1	RG5-3783-000CN	RG5-5187-000CN
3	Power supply, 110V	1	RH3-2189-000CN	RH3-2189-000CN

Internal components (1 of 3) (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
3	Power supply, 220V	1	RH3-2190-000CN	RH3-2190-000CN
4	High-voltage power supply	1	RG5-3285-000CN	RG5-5165-000CN
5	Strap, cover support	1	RB2-1556-000CN	RB2-1556-000CN
6	ITB assembly	1	RG5-3397-000CN	RG5-3397-000CN
7	ITB drawer assembly	1	RG5-3190-000CN	RG5-3190-000CN
8	Handle, ITB drawer	1	RB2-1361-000CN	RB2-1361-000CN
9	Filter, air (small)	1	RB2-1283-000CN	RB2-1283-000CN
10	Fan, small	1	RH7-1407-000CN	RH7-1407-000CN
11	Fuser, 110V	1	RG5-3250-000CN C4084-69002*	RG5-3250-000CN C4084-69002*
11	Fuser, 220V	1	RG5-3251-000CN C4084-69003*	RG5-3251-000CN C4084-69003*
12	Kit, Fuser Deflector	1	C4084-67906	C4084-67906
13	Drum bushing assembly	1	RG5-3319-000CN	RG5-3319-000CN
14	Rod, delivery	1	RB2-1284-000CN	RB2-1284-000CN
15	Spring, tension	1	RS5-2754-000CN	RS5-2754-000CN
16	Face-down delivery assembly	1	RG5-5135-000CN	RG5-5135-000CN
17	Filter, air (large)	1	RB2-1282-000CN	RB2-1282-000CN

*These parts require exchange



Internal components (2 of 3

Internal components (2 of 3)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cable, video interface	1	RH2-5335-000CN	RH2-5335-000CN
2	Interconnect PCB	1	RG5-3808-000CN	RG5-3808-000CN
3	Guide, cable	1	RB2-1277-000CN	RB2-1277-000CN
4	Main cable	1	RG5-3781-000CN	RG5-5186-000CN
5	Roller, transfer	1	RF5-2112-000CN	RF5-2112-000CN
6	Drum drawer assembly	1	RG5-5211-000CN	RG5-5142-000CN
7	Drum drive assembly	1	RG5-3170-000CN	RG5-3170-000CN

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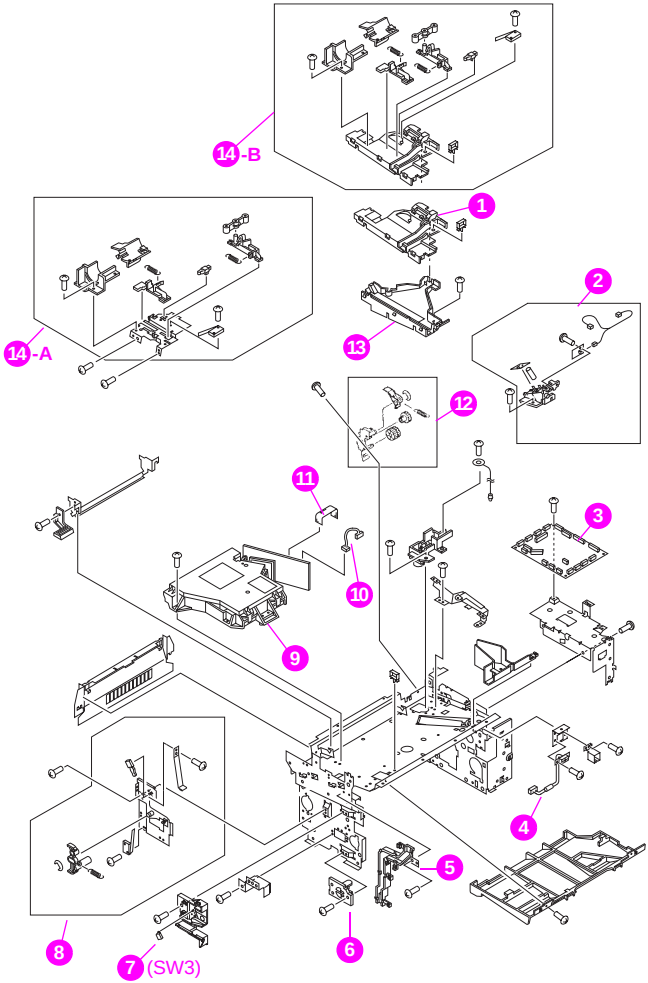

Internal components (3 of 3)

Internal components (3 of 3)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Guide, upper drum drawer cable	1	RB2-1457-000CN	(included in 14B)
2	Sensor, waste toner (PS13)	1	RG5-3292-000CN	RG5-3292-000CN
3	DC controller PCB	1	RG5-3809-000CN	RG5-5179-000CN
4	Cable, fan	1	RG5-4650-000CN	RG5-4650-000CN
5	Cover, cable	1	RB2-1180-000CN	RB2-1180-000CN
6	Bushing, ITB left	1	RB2-1158-000CN	RB2-5185-000CN
7	Microswitch	1	WC2-5330-000CN	WC2-5330-000CN
8	Drawer switch assembly	1	RG5-3296-030CN	RG5-3296-030CN
9	Laser/scanner assembly	1	RG5-5175-000CN	RG5-5175-000CN
10	Cable, laser	1	RG5-3782-000CN	RG5-3782-000CN
11	Cable, laser (flat)	1	RH2-5334-000CN	RH2-5334-000CN
12	Carousel brake assembly	1	RG5-3309-000CN	RG5-5163-000CN
13	Guide, cable, lower	1	RB2-1456-000CN	RB2-1456-000CN
14A/ 14B	Door switch assembly	1	RG5-3291-000CN	RG5-5170-000CN

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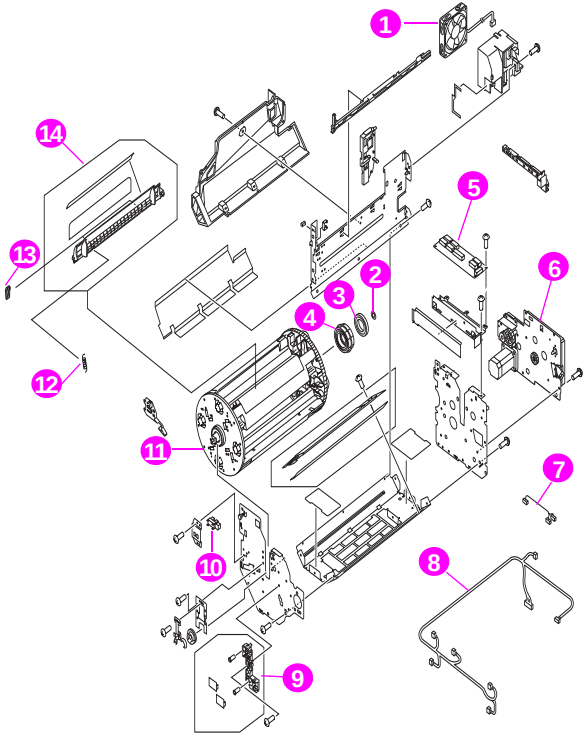

Developing carousel assembly

Developing carousel assembly

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Fan, large	1	RH7-1346-000CN	RH7-1435-000CN
2	Spacer	1	RS5-6210-000CN	RS5-6210-000CN

Developing carousel assembly (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
3	Bearing, carousel	1	XG9-0361-000CN	N/A
4	Gear, 125T	1	RS6-0176-000CN	RS6-0759-000CN
5	Developing PCB	1	RG5-3811-000CN	RG5-5180-000CN
6	Carousel drive assembly	1	RG5-5209-000CN	RG5-5209-000CN
7	Cable, fusing connector	1	RG5-3886-000CN	RG5-3886-000CN
8	Cable, rotary	1	RG5-3795-000CN	RG5-3795-000CN
9	Sensor (PS12), toner level	1	RG5-3355-000CN	RG5-3355-000CN
10	Sensor (PS10), carousel position	1	WG8-5362-000CN	WG8-5362-000CN
11	Carousel assembly	1	RG5-3370-000CN	RG5-3370-000CN
12	Spring, toner flap	2	RS5-2739-000CN	RS5-2739-000CN
13	Cap, toner flap	2	RB2-0964-000CN	N/A
14	Kit, carousel flap	1	C4084-67909	C4084-67909

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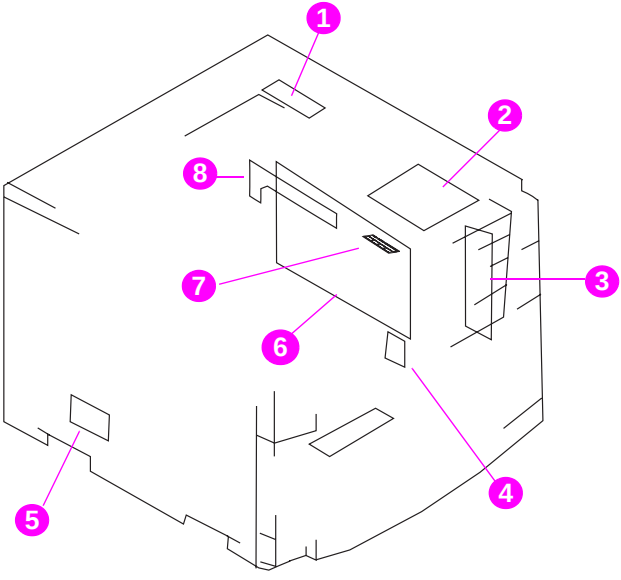

PCB locations

PCB assembly

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Developing PCB	1	RG5-3811-000CN	RG5-5180-000CN
2	DC controller PCB	1	RG5-3809-000CN	RG5-5179-000CN
3	Interconnect PCB	1	RG5-3808-000CN	RG5-3808-000CN
4	Paper size sensor PCB	1	RG5-3816-000CN	RG5-3816-000CN
5	Paper feed PCB	1	RG5-3810-000CN	RG5-3810-000CN

PCB assembly (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
6	Formatter PCB	1	C4084-69001*	C4084-69001*
7	Firmware DIMM	1	C4084-60004	C4084-60004
8	IO card	1	C4081-60001	C4081-60001

*These parts require exchange

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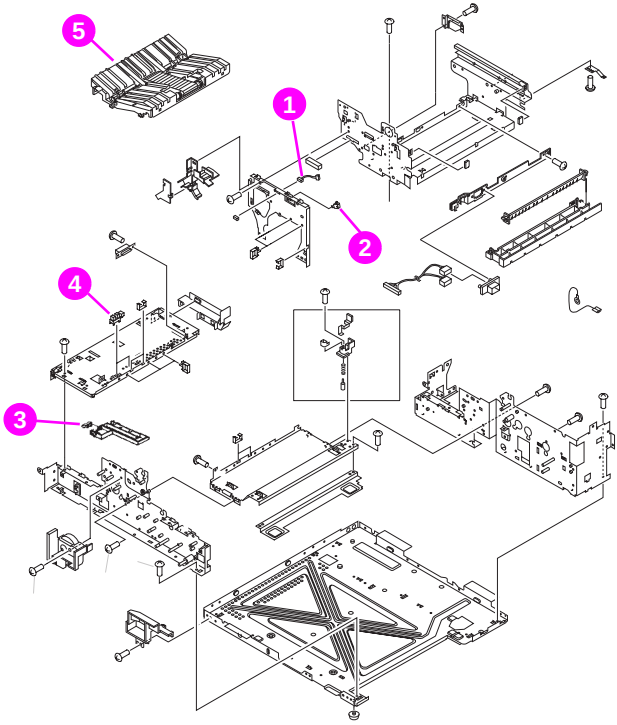

Paper pick-up assembly (1 of 3)

Paper pick-up assembly (1 of 3)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cable, ITB switch	1	RG5-4651-000CN	RG5-4651-000CN
2	Microswitch, ITB	1	WC2-5330-000CN	WC2-5330-000CN
3	Sensor (PS7), delivery paper		WG8-5222-000CN	WG8-5222-000CN
4	Sensor (PS6), fusing unit pressure release	1	WG8-5309-000CN	WG8-5309-000CN
5	Feeder assembly	1	RG5-3226-000CN	RG5-5117-000CN

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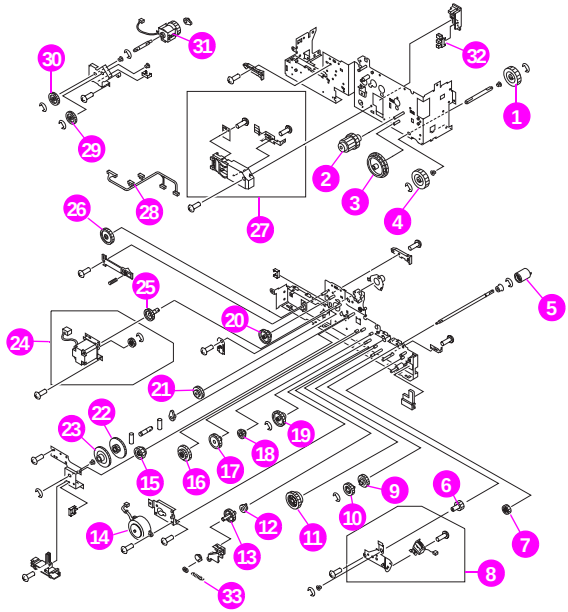

Paper pick-up assembly (2 of 3)

CAUTION

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Paper pick-up assembly (2 of 3)

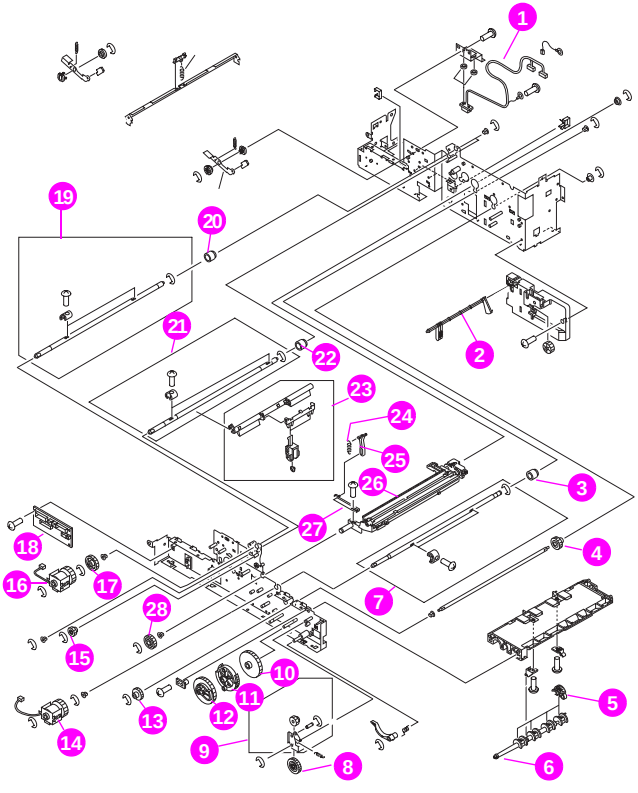
Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Gear, 17T	2	RS6-0158-000CN	RS6-0158-000CN
2	Gear, 18T/14T	1	RS6-0157-000CN	RS6-0157-000CN

Paper pick-up assembly (2 of 3) (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
3	Gear, 53T/46T	1	RS6-0156-000CN	RS6-0156-000CN
4	Gear, 17T	1	RS6-0158-000CN	RS6-0158-000CN
5	Roller	1	RF5-2092-000CN	RF5-2092-000CN
6	Gear, 18T	1	RS6-0140-000CN	RS6-0140-000CN
7	Gear, 19T	1	RS6-0141-000CN	RS6-0141-000CN
8	Solenoid, Tray 2 feed (SL2)	1	RG5-3245-000CN	RG5-5119-000CN
9	Gear, 27T	1	RS6-0135-000CN	RS6-0135-000CN
10	Gear, 27T	1	RS6-0135-000CN	RS6-0135-000CN
11	Gear, 30T/16T	1	RS6-0134-000CN	RS6-0134-000CN
12	Bushing	2	RS5-1293-000CN	RS5-1293-000CN
13	Gear, 31T	1	RS6-0136-000CN	RS6-0136-000CN
14	Motor (M2), stepping	1	RH7-1343-000CN	RH7-1343-000CN
15	Gear, 47T	1	RS6-0147-000CN	RS6-0147-000CN
16	Gear, 24T/37T	1	RS6-0163-000CN	RS6-0163-000CN
17	Gear, 35T	1	RS6-0132-000CN	RS6-0132-000CN
18	Gear, 20T	1	RS6-0138-000CN	RS6-0138-000CN
19	Gear, 37T/14T	1	RS6-0133-000CN	RS6-0133-000CN
20	Gear, 34T/15T	1	RS6-0144-000CN	RS6-0144-000CN
21	Gear, 29T/17T	1	RS6-0145-000CN	RS6-0145-000CN
22	Gear, 18T/52T	1	RS6-0148-000CN	RS6-0148-000CN
23	Gear, 52T	1	RS6-0146-000CN	RS6-0146-000CN
24	Motor (M1), fusing assembly	1	RG5-3227-000CN	RG5-3227-000CN

Paper pick-up assembly (2 of 3) (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
25	Gear, 26T	1	RS6-0149-000CN	RS6-0149-000CN
26	Gear, 37T	1	RS6-0143-000CN	RS6-0143-000CN
27	Sensor, paper size	1	RG5-3234-000CN	RG5-3234-000CN
28	Cable, paper feed	1	RG5-3785-000CN	RG5-3785-000CN
29	Gear, 29T	1	RS6-0150-000CN	RS6-0150-000CN
30	Gear, 29T	1	RS6-0150-000CN	RS6-0150-000CN
31	Clutch (CL2), electromagnetic	1	RH7-5176-000CN	RH7-5176-000CN
32	Sensor (PS8), cassette paper	1	WG8-5309-000CN	WG8-5309-000CN
33	Spring, Tray 2 pickup tension	1	RS5-2794-000CN	RS5-2794-000CN



Paper pick-up assembly (3 of 3)

Paper pick-up assembly (3 of 3)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
1	Cable, fusing/ option	1	RG5-3787-000CN	RG5-3787-000CN
2	Lever, sensor	1	RB2-0576-000CN	RB2-0576-000CN
3	Clutch, one-way	1	RB2-0572-000CN	RB2-0572-000CN
4	Gear, 18T	1	RS6-0139-000CN	RS6-0139-000CN
5	Roller, paper pick	4	RB1-8865-000CN	RB1-8865-000CN
6	Shaft, paper pick	1	RB2-0545-000CN	RB2-0545-000CN
7	Transfer cam assembly	1	RG5-3240-000CN	RG5-5118-000CN
8	Gear, 26T/18T	1	RS6-0137-000CN	RS6-0137-000CN
9	Gear assembly	1	RG5-3228-000CN	RG5-3228-000CN
10	Gear, 53T	1	RS6-0155-000CN	RS6-0155-000CN
11	Gear, 39T/31T	1	RS6-0154-000CN	RS6-0154-000CN
12	Gear, 49T	1	RS6-0153-000CN	RS6-0153-000CN
13	Gear, 18T	1	RS6-0139-000CN	RS6-0139-000CN
14	Clutch (CL4), electromagnetic	1	RH7-5180-000CN	RH7-5180-000CN
15	Gear, 16T	1	RS6-0151-000CN	RS6-0151-000CN
16	Clutch (CL3), electromagnetic	1	RH7-5178-000CN	RH7-5178-000CN
17	Gear, 29T	1	RS6-0152-000CN	RS6-0152-000CN
18	Paper feed PCB assembly	1	RG5-3810-000CN	RG5-3810-000CN
19	ICL cam assembly	1	RG5-3242-000CN	RG5-3242-000CN
20	Clutch, one-way	1	RB2-0561-000CN	RB2-0561-000CN

Paper pick-up assembly (3 of 3) (continued)

Ref.	Description	Qty.	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
21	ITB cam assembly	1	RG5-3241-000CN	RG5-3241-000CN
22	Clutch, one-way	1	RB2-0561-000CN	RB2-0561-000CN
23	Rowel swing assembly	1	RG5-4696-000CN	RG5-4696-000CN
24	Spring tension	1	RS5-2800-000CN	RS5-2800-000CN
25	Link rowel	1	RB2-0614-000CN	RB2-0614-000CN
26	Transfer assembly, secondary	1	RG5-3235-000CN	RG5-5115-000CN
27	Plate support	1	RF5-2138-000CN	(included in #26)
28	Gear, 26T	1	RS6-0159-000CN	RS6-0159-000CN

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Alphabetical parts list

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Alphabetical parts list

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
500-sheet paper cassette	RG5-3900-000CN	RG5-3900-000CN
500-sheet paper feeder	C4082-67901	C4082-67901
Arm, lifter, left	RB1-9012-000CN	RB1-9012-000CN
Arm, lifter, right	RB1-9013-000CN	RB1-9013-000CN
Bearing, carousel	XG9-0361-000CN	N/A
Bushing, ITB, left	RB2-1158-000CN	RB2-5185-000CN
Bushing	RS5-1293-000CN	RS5-1293-000CN
Cable, fusing connector	RG5-3886-000CN	RG5-3886-000CN
Cable, control panel	RG5-3802-000CN	RG5-5195-000CN
Cable, developer	RG5-3783-000CN	RG5-5187-000CN
Cable, fan	RG5-3887-000CN	N/A
Cable, fan	RG5-4650-000CN	RG5-4650-000CN
Cable, fusing/option	RG5-3787-000CN	RG5-3787-000CN
Cable, ITB switch	RG5-4651-000CN	RG5-4651-000CN
Cable, laser	RG5-3782-000CN	RG5-3782-000CN
Cable, laser (flat)	RH2-5334-000CN	RH2-5334-000CN
Cable, paper feed	RG5-3785-000CN	RG5-3785-000CN

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Cable, rotary	RG5-3795-000CN	RG5-3795-000CN
Cable, video interface	RH2-5335-000CN	RH2-5335-000CN
Cap, toner flap	RB2-0964-000CN	N/A
Carousel assembly	RG5-3370-000CN	RG5-3370-000CN
Carousel brake assembly	RG5-3309-000CN	RG5-5163-000CN
Carousel drive assembly	RG5-5209-000CN	RG5-5209-000CN
Clutch (CL2), electromagnetic	RH7-5176-000CN	RH7-5176-000CN
Clutch (CL3), electromagnetic	RH7-5178-000CN	RH7-5178-000CN
Clutch (CL4), electromagnetic	RH7-5180-000CN	RH7-5180-000CN
Clutch, one-way	RB2-0572-000CN	RB2-0572-000CN
Clutch, one-way	RB2-0561-000CN	RB2-0561-000CN
Control panel assembly	RG5-3345-000CN	RG5-3345-000CN
Cover, cable	RB2-1180-000CN	RB2-1180-000CN
Cover, connector	RB2-1224-000CN	RB2-1224-000CN
Cover, drum drawer	RG5-5232-000CN	RG5-5152-000CN
Cover, ITB drawer	RG5-3320-000CN	RG5-3320-000CN
Cover, left side	RG5-3313-000CN	RG5-5151-000CN
Cover, lower rear	RB2-1206-000CN	RB2-1206-000CN
Cover, rear	RB2-1205-000CN	RB2-1205-000CN
Cover, right front	RG5-3310-000CN	RG5-3310-000CN

Alphabetical parts list (continued)

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Cover, right side	RB2-1203-000CN	RB2-1203-000CN
Cover, toner access	RF5-2076-000CN	RF5-3137-000CN
Cover, top	RG5-3300-000CN	RG5-5150-000CN
DC controller PCB	RG5-3809-000CN	RG5-5179-000CN
Developing PCB	RG5-3811-000CN	RG5-5180-000CN
Door switch assembly	RG5-3291-000CN	RG5-5170-000CN
Door, rear access	RG5-3325-040CN	RG5-3325-040CN
Drawer switch assembly	RG5-3296-040CN	RG5-3296-030CN
Drum bushing assembly	RG5-3319-000CN	RG5-3319-000CN
Drum drawer assembly	RG5-5211-000CN	RG5-5142-000CN
Drum drive assembly	RG5-3170-000CN	RG5-3170-000CN
Face-down delivery assembly	RG5-5135-000CN	RG5-5135-000CN
Fan, large	RH7-1346-000CN	RH7-1435-000CN
Fan, small	RH7-1407-000CN	RH7-1407-000CN
Feeder assembly	RG5-3226-000CN	RG5-5117-000CN
Filter, air (large)	RB2-1282-000CN	RB2-1282-000CN
Filter, air (small)	RB2-1283-000CN	RB2-1283-000CN
Firmware DIMM	C4084-60004	C4084-60004
Formatter PCB	C4084-69001*	C4084-69001*
Fuser, 110V	RG5-3250-000CN C4084-69002*	RG5-3250-000CN C4084-69002*

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Fuser, 220V	RG5-3251-000CN C4084-69003*	RG5-3251-000CN C4084-69003*
Gear assembly	RG5-3228-000CN	RG5-3228-000CN
Gear, 125T	RS6-0176-000CN	RS6-0759-000CN
Gear, 16T	RS6-0151-000CN	RS6-0151-000CN
Gear, 17T	RS6-0158-000CN	RS6-0158-000CN
Gear, 18T	RS6-0140-000CN	RS6-0140-000CN
Gear, 18T	RS6-0139-000CN	RS6-0139-000CN
Gear, 18T/14T	RS6-0157-000CN	RS6-0157-000CN
Gear, 18T/52T	RS6-0148-000CN	RS6-0148-000CN
Gear, 19T	RS6-0141-000CN	RS6-0141-000CN
Gear, 20T	RS6-0138-000CN	RS6-0138-000CN
Gear, 24T/37T	RS6-0163-000CN	RS6-0163-000CN
Gear, 26T	RS6-0149-000CN	RS6-0149-000CN
Gear, 26T	RS6-0159-000CN	RS6-0159-000CN
Gear, 26T/18T	RS6-0137-000CN	RS6-0137-000CN
Gear, 27T	RS6-0135-000CN	RS6-0135-000CN
Gear, 29T	RS6-0150-000CN	RS6-0150-000CN
Gear, 29T	RS6-0152-000CN	RS6-0152-000CN
Gear, 29T/17T	RS6-0145-000CN	RS6-0145-000CN
Gear, 30T/16T	RS6-0134-000CN	RS6-0134-000CN
Gear, 31T	RS6-0136-000CN	RS6-0136-000CN
Gear, 34T/15T	RS6-0144-000CN	RS6-0144-000CN

Alphabetical parts list (continued)

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Gear, 35T	RS6-0132-000CN	RS6-0132-000CN
Gear, 37T	RS6-0143-000CN	RS6-0143-000CN
Gear, 37T/14T	RS6-0133-000CN	RS6-0133-000CN
Gear, 39T/31T	RS6-0154-000CN	RS6-0154-000CN
Gear, 47T	RS6-0147-000CN	RS6-0147-000CN
Gear, 49T	RS6-0153-000CN	RS6-0153-000CN
Gear, 52T	RS6-0146-000CN	RS6-0146-000CN
Gear, 53T	RS6-0155-000CN	RS6-0155-000CN
Gear, 53T/46T	RS6-0156-000CN	RS6-0156-000CN
Guide, cable	RB2-1277-000CN	RB2-1277-000CN
Guide, cable, lower	RB2-1456-000CN	RB2-1456-000CN
Guide, upper drum drawer cable	RB2-1457-000CN	N/A
Handle, ITB drawer	RB2-1361-000CN	RB2-1361-000CN
High-voltage power supply	RG5-3285-000CN	RG5-5165-000CN
ICL cam assembly	RG5-3242-000CN	RG5-3242-000CN
Indicator, paper level	RB1-9009-000CN	RB1-9009-000CN
Interconnect PCB	RG5-3808-000CN	RG5-3808-000CN
IO card	C4081-60001	C4081-60001
ITB assembly	RG5-3397-000CN	RG5-3397-000CN
ITB cam assembly	RG5-3241-000CN	RG5-3241-000CN
ITB drawer assembly	RG5-3190-000CN	RG5-3190-000CN

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Kit, carousel flap	C4084-67909	C4084-67909
Kit, Fuser Deflector	C4084-67906	C4084-67906
Laser/scanner assembly	RG5-5175-000CN	RG5-5175-000CN
Lever, sensor	RB2-0576-000CN	RB2-0576-000CN
Limiter, torque	RB1-8974-000CN	RB1-8974-000CN
Link rowel	RB2-0614-000CN	RB2-0614-000CN
Main cable	RG5-3781-000CN	RG5-5186-000CN
Microswitch	WC2-5330-000CN	WC2-5330-000CN
Microswitch, ITB	WC2-5330-000CN	WC2-5330-000CN
Motor (M1), fusing assembly	RG5-3227-000CN	RG5-3227-000CN
Motor (M2), stepping	RH7-1343-000CN	RH7-1343-000CN
Paper feed assembly	RG5-3810-000CN	RG5-3810-000CN
Paper size sensor PCB	RG5-3816-000CN	RG5-3816-000CN
Plate support	RF5-2138-000CN	N/A
Power supply, 110V	RH3-2189-000CN	RH3-2189-000CN
Power supply, 220V	RH3-2190-000CN	RH3-2190-000CN
Rod, delivery	RB2-1284-000CN	RB2-1284-000CN
Roller	RF5-2092-000CN	RF5-2092-000CN
Roller, paper pick	RB1-8865-000CN	RB1-8865-000CN
Roller, transfer	RF5-2112-000CN	RF5-2112-000CN
Rowel swing assembly	RG5-4696-000CN	RG5-4696-000CN
Sensor (PS3), last paper	WG8-5364-000CN	WG8-5364-000CN

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Sensor (PS4), multi-purpose tray paper	WG8-5309-000CN	WG8-5309-000CN
Sensor (PS6), fusing unit pressure release	WG8-5309-000CN	WG8-5309-000CN
Sensor (PS7), delivery paper	WG8-5222-000CN	WG8-5222-000CN
Sensor (PS8), cassette paper	WG8-5309-000CN	WG8-5309-000CN
Sensor (PS10), carousel position	WG8-5362-000CN	WG8-5362-000CN
Sensor (PS12), toner level	RG5-3355-000CN	RG5-3355-000CN
Sensor (PS13), waste toner	RG5-3292-000CN	RG5-3292-000CN
Sensor (PS14), density	RG5-3281-000CN	RG5-5149-000CN
Sensor, paper size	RG5-3234-000CN	RG5-3234-000CN
Shaft, paper pick	RB2-0545-000CN	RB2-0545-000CN
Solenoid, Tray 2 feed (SL2)	RG5-3245-000CN	RG5-5119-000CN
Spacer	RS5-6210-000CN	RS5-6210-000CN
Spring, tension	RS5-2800-000CN	RS5-2800-000CN
Spring, tension	RS5-2754-000CN	RS5-2754-000CN
Spring, toner flap	RS5-2739-000CN	RS5-2739-000CN
Spring, Tray 2 pickup tension	RS5-2794-000CN	RS5-2794-000CN
Springs, torsion	RB1-9016-000CN	RB1-9016-000CN

Description	Parts for printer s/n xxG and below	Parts for printer s/n xxH and above
Strap, cover support	RB2-1556-000CN	RB2-1556-000CN
Transfer assembly, secondary	RG5-3235-000CN	RG5-5115-000CN
Transfer cam assembly	RG5-3240-000CN	RG5-5118-000CN
Tray, extension	RB2-1215-000CN	RB2-1215-000CN

9 Image quality

Overview

This chapter includes information on the following topics:

- The printer cleaning page
- Image formation troubleshooting
- Examples of image defects and recommended corrective actions
- Overhead transparency defect troubleshooting
- Repetitive defect troubleshooting

Image formation troubleshooting

Before beginning image formation troubleshooting, check that the media meets the specifications listed in the *HP LaserJet Printer Family Paper Specification Guide.*

Print density test and color checks

Use the configuration page to check the print density (the black levels). The configuration page has solid black-filled areas that demonstrate the ability to print black at full density. The configuration page also tests the ability to print each primary and process color.

In addition to the items listed above, the configuration page shows the following information:

- helps isolate the problem to the software or the printer
- shows that all colors print

The following media-related items are responsible for many image formation and print-quality defects:

- rough paper
- heavy paper
- transparencies out of the specified thickness range
- paper that has absorbed too much moisture from the atmosphere
- room environment (humidity too high or low)

Understanding color variations

The printed output may not match the computer screen, and the colors printed on successive pages may not match. While color variations are inherent in this printing method, they may indicate changes in the printing environment, print media, or printer components.

Common causes of color variation

The following list outlines the major causes of color variations between computers, applications, and output devices.

- Halftone patterns produced on monitors and the types of patterns used in the print jobs are different and might cause variations in the printed output.
- The printed output differs from the image on the monitor because the monitor and the print media have different reference values of black and white. The monitor screen has charcoal gray for the black level, and the white on the monitor screen is actually blue. Black on the print media is limited only by the fill capability of the printer, and most good quality paper has a very high white level. In addition, phosphor (used in color monitors) and toner have entirely different spectra characteristics and different color rendering capabilities. Differences between output are common. Blues generally match better than reds.
- The color of the ambient light changes the perception of color. Fluorescent light lacks many colors present in incandescent light, and the color range of natural light is broader than any artificial light. When comparing color, choose a standard light source for reference and understand that the perceived color will change as the light changes.
- Long term color variations occur as paper ages. Use high quality paper and protect the paper from sunlight to help minimize discoloration.
- Environmental changes can cause color variation. The development process places a high potential across an air gap to attract toner to the imaging drum. Changes in relative humidity vary the point at which the toner travels to the imaging drum.
- All consumable components have a finite life span, and as these components reach the end of their useful life, their ability to produce consistent print quality diminishes.
- Paper roughness can cause colors to appear different. Use standard paper.

Color selection process

The user selects the color in the application, but the operating system may convert or modify some characteristics of the color before sending the information to the printer driver. The printer driver may also modify color characteristics depending upon the selected output mode.

Any color characteristics not addressed by the printer driver or applications are set to the printer default. The default color may not match the color the user selected.

Customizing color output through printer drivers

The printer driver, which is installed with your printer software, enables your software applications to use the features of the printer. It also gives you customized control of color text, graphics, and photos.

The method of accessing your printer driver depends on your computer's operating system. For specific instructions on accessing printer drivers, see the printer driver's Readme file, which is included on the printing system CD-ROM.

The following color control features are available only through your HP printer driver. See the printer driver's on-line Help for details on color settings and their effect on printed output.

Halftone options

Halftone options affect the resolution and clarity of your color output. You can select halftone settings for text, graphics, and photos independently. The two halftone options are smooth and detail.

The smooth option provides better results for large, solid-filled print areas. It also enhances photos by smoothing out fine color gradations.

The detail option is useful for text and graphics that require sharp distinctions among lines or colors, such as images that contain a pattern or a high level of detail.

HP ColorSmart II

HP ColorSmart II default settings will produce optimum results for most color printing needs. However, you can also manually adjust color settings through the printer driver's Vivid color and Screen match color control options.

Vivid color

Vivid Color allows print to have a higher color saturation by putting more toner on the page, however, this may cause high potential for scatter.

Screen match

Screen Match (sRGB) (standard red-green-blue) prints colors that are close to those you see on your screen. Screen Match can be useful for retouching photographs or when you have created colors on your screen that you wish to reproduce, such as special colors for a company logo.

Note

Factors such as the type of monitor you use and the room's lighting can affect the appearance of colors on your screen.

Print in grayscale

The Print in Grayscale option in the printer driver allows you to print documents using shades of gray in place of colors. This option is ideal for printing proofs of color documents, or for printing documents that will later be faxed or photocopied.

Matching colors

The process of matching printer output color to your monitor is quite complex because printers and computer monitors use different methods of producing color. Monitors *display* colors by light pixels using an RGB (red, green, blue) color process, but printers *print* colors using a CMYK (cyan, magenta, yellow, and black) process.

Color-matching factors

Several factors can influence your ability to match printed colors to those on your monitor. These factors include:

- print media
- overhead lighting
- personal differences in perception
- software applications
- operating system palettes
- monitors
- video cards and drivers

Matching PANTONE®* colors

In addition to controlling color through the printer driver, you can control color through PANTONE®* color matching.

PANTONE®* colors are certified RGB and CMYK values specified in the PANTONE®* color-matching system, which is supported in many graphics software applications. This color-matching system is useful for matching printer output to a specific color (for example, a logo). See the documentation for your software application for instructions on using PANTONE®* colors.

For more information on using PANTONE®* colors, see the Readme file for the PANTONE®* color-matching system included on the printing system CD-ROM.

Note

Color settings, halftone settings, and print media affect the appearance of PANTONE®* colors. To achieve true PANTONE®*-certified colors, all components used, including the video driver, software application or printer driver, and the print media, must be PANTONE®*-certified.

Adjusting color balance

This printer features automatic color calibration to provide high-quality color output. In situations that require critical color control, you can manually adjust the density balance of the printer's four toner colors.

CAUTION

This procedure should only be performed by your network administrator. Performing this procedure changes the color balance of the printer by altering halftones and affects *all* print jobs.

To adjust color balance

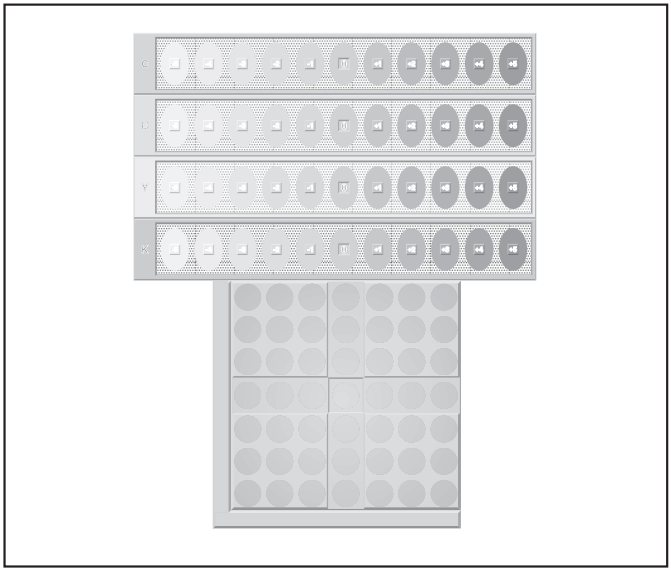
Step 1: Print a color balance calibration page

The color balance calibration page (shown below) displays current color settings and provides a record of the printer's initial settings before any adjustments are made.

1. Press **MENU** until `CALIBRATION MENU` displays.
2. Press **ITEM** until `PRINT CALIBRATION PAGE` displays.
3. Press **SELECT** to print the color balance calibration page. The page consists of four color bars (cyan, magenta, yellow, and black) and a box containing gray balance circles. The factory default setting for each color is zero. The range of settings is -5 to +5.

Note

Adjusting densities using the four color bars provides coarse color balance adjustments. After making these adjustments, you can fine-tune color densities by adjusting the gray balance. (See step 7 for instructions.)



Color balance calibration page

Step 2: Adjust the cyan (C) density setting

Examine the cyan density bar (C) on the color balance calibration page from a distance of 2 meters (6 feet). If the center oval matches the background pattern more than the other ovals, the cyan density does not need to be adjusted and you should continue on to the magenta (M) setting. If an oval left of center or right of center matches the background more than the center oval, use the following steps to enter the number:

1. Press **ITEM** until `CYAN DENSITY` displays.
2. Press the right side of the **VALUE** key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press **SELECT** to save the value. An asterisk (*) displays next to the selected setting.

Step 3: Adjust the magenta (M) density setting

Examine the magenta density bar (M). If the center oval matches the background pattern more than the other ovals, the magenta density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1 Press **ITEM** until `MAGENTA DENSITY` displays.

2 Press the right side of the **VALUE** key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press **SELECT** to save the value. An asterisk (*) displays next to the selected setting.

Step 4: Adjust the yellow (Y) density setting

Examine the yellow density bar (Y). If the center oval matches the background pattern more than the other ovals, the yellow density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1 Press **ITEM** until `YELLOW DENSITY` displays.

2 Press the right side of the **VALUE** key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press **SELECT** to save the value. An asterisk (*) displays next to the selected setting.

Step 5: Adjust the black (K) density setting

Examine the black density bar (K). If the center oval matches the background pattern more than the other ovals, the black density does not need to be adjusted and you should continue with the next step. If not, use the following steps to adjust the density:

1 Press **ITEM** until `BLACK DENSITY` displays.

2 Press the right side of the **VALUE** key to increase the value, or press the left side to decrease it, until the number corresponding to the oval that most closely matches the background pattern is displayed.

3 Press **SELECT** to save the value. An asterisk (*) displays next to the selected setting.

Step 6: Reprint the color balance calibration page (see step 1)

Step 7: Adjust gray balance

Note

Adjusting densities using the gray balance pattern allows you to fine-tune color balance. This process affects all four color bars.

Examine the gray balance circles in the box at the bottom of the color balance calibration page. If the circle in the center most closely matches the background pattern, then the gray balance does not need to be adjusted. If the circle does not match, use the following steps to adjust gray balance.

1 Locate the gray circle that most closely matches the background. The magenta (M) and yellow (Y) numbers associated with this circle indicate the optimum gray balance settings for these colors.

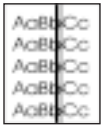
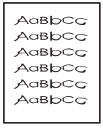
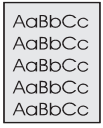
2 Adjust the magenta and yellow settings (yellow is horizontal and magenta is vertical) until the gray circle is in the middle. Use the values from the bars above to select the value to be entered.

3 After making adjustments to the magenta and yellow settings, press **GO** to return the printer to the READY state.

Image Defect Table

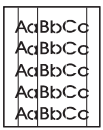
For more information, see the page numbers below each image.

Image Defect Table

Background scatter (see page 155)	No image available Banding and horizontal lines (see page 155)	 Black lines (see page 157)	Black or partially black pages (see page 157)
Blank page or white pages (see page 158)	Blank spots (see page 159)	Character voids (see page 159)	 Distorted image (see page 160)
Dropouts (see page 161)	Faded print, faded areas, or faded vertical streaks (see page 161)	No image available Ghosting (see page 162)	 Gray background (see page 162)

9

Image Defect Table (continued)

Irregular raised spots or stray toner (see page 163)	Light print, dark print, faded print (see page 163)	No image available Light black or no black print (see page 163)	Loose toner (see page 164)
No image available Mottled or marbled output (see page 164)	Random black spots (see page 164)	No image available Sharkskin (see page 165)	No image available Single color missing (see page 165)
No image available Sunburn (see page 165)	Toner smear (see page 166)	 Vertical lines or streaks (see page 166)	Wavy characters (see page 167)

Additional defect information is found in the following sections:

- Overhead transparency defects (see page 168)
- Repetitive defects (see page 171)

Image defect details

Background scatter

- The media does not meet HP specifications.
- The toner cartridge is defective.
- The inside of the printer is dirty.
- The transfer roller is dirty or worn.
- Generate a cleaning page.

Banding and horizontal lines

Banding occurs when solid fill areas show streaks or bands of shade variations. This can be caused by:

- Worn, damaged, or contaminated gears
- Consumables that are beyond their rated life
- Improper consumable storage

If the problem persists:

- Print a configuration page to check the life of the consumables. Replace any consumable that is past its rated life.
- Banding is more visible in some halftone patterns than in others. Print a page using a halftone pattern such as “banddiag” provided in the Color Smart selection in the printer driver. If the defect occurs only once on a letter size sheet, try printing the pattern on a legal-size sheet.

- Observe the following from the test sample:
  - Check the spacing or “pitch” between the defects.
  - Check to see if the defect spans all color planes.
  - If the defect is in all color planes, does the defect produce a straight line through all color planes or does it move from one color plane to the next?
  - If the defect moves from one color plane to the next, measure the amount it moves. This movement amount is called the “procession.” Keep in mind the print order is K-M-C-Y. Measure the procession from K to M or M to C, not K to C.

CAUTION

Do not expose the drum to light for more than 15 seconds. The drum is light sensitive, and exposure to light can cause permanent damage.

Banding — horizontal

- The imaging drum may have been exposed to light. (See “Sunburn” on page 165.)
- The ITB may accumulate contamination on its rollers causing a random mechanical banding. If you notice buildup on the rollers, replace the ITB.
- As the developer rotates, the gap between the imaging drum and the developer can vary slightly. This can cause toner to be transferred lighter or darker every 37 mm. This defect is more apparent in secondary colors. There is no workaround.

Banding — vertical

- The doctor blade on the developer can develop notches over time. If you observe severe notching, replace the developer.
- As the imaging drum gets older, the charge roller doesn’t charge the imaging drum as well as it used to. If you notice buildup or contamination on the charge roller, replace the imaging drum.

Black lines

- The toner cartridge is defective.
- The toner cartridge is not seated properly.
- The fusing assembly is contaminated or damaged.
- The static eliminator teeth are contaminated or defective.

Black or partially black pages

- Check for poor contact between the drum cartridge contact (for primary charging bias) and the primary charging bias contact. To improve the contact, clean the contacts. If the problem persists after cleaning or the contacts are deformed or damaged, replace them. If the contacts have slipped off, adjust them correctly.
- Check the drum cartridge (primary charging roller). If defective, replace the drum cartridge.
- Check for poor contacts in the connectors. Reconnect the DC controller PCB connector and the high-voltage PCB 2 connector correctly.
- Check for a defective high-voltage PCB (primary charging bias output shortage). If defective, replace the high-voltage PCB 2.
- Check for a defective DC controller PCB. If defective, replace the DC controller PCB.
- If ITB clutch was removed, check for proper timing.
- The black toner cartridge is empty.
- Make sure clutch CL2 is connected (plugged into the paper PCA).
- This defect can be caused by improper timing on the ITB clutch gears. Make sure that the cams are in sync. The two white gears on the left side of the printer should have two timing marks pointing toward each other.
  - Cams with a single line should be off one tooth clockwise on the right gear.
  - Cams with a double line should be aligned.

Blank or white pages

- Your software application is sending an extra page-eject command.
  - Check the software's printing configuration information.
- There is a problem with the network configuration. Some sharing devices on networks may generate a blank page as a separator.
  - Check with the network administrator.
- The printer may be feeding two or more pages at once because the paper is difficult to separate.
- The sealing tape has been left in the toner cartridge.
- The toner cartridge is empty or defective.
- The laser scanner door does not open properly.
  - Remove and reseat the toner cartridge.
  - Check the laser scanner shutter door for proper operation.
- The toner cartridge guide is damaged, improperly positioned, or missing.
- There is no transfer roller voltage.
  - Perform the Half Self-Test Functional Check to check all other electrophotographic processes.
  - Replace the transfer roller if necessary.
- The high-voltage connectors are mounted on the high-voltage power supply (HVPS) PCA and protrude into the toner cartridge cavity.
  - Check the springs for functionality. Clean if dirty; replace if defective or missing.
  - The HVPS PCA is defective.
- The DC controller PCA is defective.
- There is no developing bias.
  - Clean the high-voltage power supply contacts. With no developing bias charge, toner is not attracted to the drum.
- There is no drum ground path.
  - Check the drum ground.
- The laser scanner cable assembly is defective.

- The page length and margins are not set correctly for the paper size.
- Verify that the ribbon connector at J1307 of the HVPS is properly seated.
- If the HVPS has been removed recently, verify that the ribbon connector from the DC controller PCA to the HVPS is properly seated at both ends.
- Verify that the photoconductive drum is rotating properly. Perform the drum diagnostic test to visually observe if the drum is rotating or using a felt-tipped marker place an index mark on the edge of the drum outside the image area. Turn on the printer (wait for drum rotation to occur) then look to see if the drum has moved. If the drum has not moved, investigate the mechanical and electrical drum rotation circuitry and movement mechanisms.
- The imaging drum shutter may not be retracting. Replace the imaging drum.

Blank spots

- The paper does not meet HP paper specifications or is stored improperly.
- The toner cartridge is defective.
- The transfer roller is dirty or defective.

Character voids

- Use paper that meets HP paper specifications.
  - The surface of the paper is too rough or the paper's surface is too smooth for proper toner adhesion.
  - Printing is on the wrong side of the paper.
  - The transparencies are not designed for proper toner adhesion.
  - The transfer roller is defective.
  - The laser scanner assembly is defective.

Colorless output (black only)

- Make sure clutch CL2 is connected (plugged into the paper PCA).
- This defect can be caused by improper timing on the ITB clutch gears. Make sure that the cams are in sync. The two white gears on the left side of the printer should have two timing marks pointing toward each other.
  - Cams with a single line should be off one tooth clockwise on the right gear.
  - Cams with a double line should be aligned.
- Check for a defective development PCB. If defective, replace the development PCB.
- Check for a defective DC controller PCB. If defective, replace the DC controller PCB.

Distorted image

- The paper does not meet HP paper specifications or is stored improperly.
- The printer operating environment does not meet HP specifications.
- The connection of the cables to the laser scanner is poor.
- The connection of the cables to the ECU is poor.
- The laser scanner is defective.
- The DC controller is defective.

Dropouts

- The paper does not meet HP paper specifications.
- The printer's operating environment does not meet specifications.
- The print density is set incorrectly.Change to a darker setting and retry printing.
- The DC controller PCA is defective.
- The high-voltage power supply PCA is defective.
- The transfer roller is defective

Faded print, faded areas, or faded vertical streaks

- The moisture content of your media may be uneven or too low. Use media from a different source or from a new ream of paper.
- If some areas of the paper rejects toner, try using paper from a different source or from a new ream of paper.
- The media may be too rough and exceed media specifications. See "Supported media specifications" on page 80. Do not use paper that exceeds specifications.
- Check that the printing environment is within humidity specifications.
- Faded print could result from low toner in a particular toner cartridge. If a Toner Low or Toner Out message displays on the printer control panel, replace the appropriate toner cartridge.
- Check to see if the transfer belt is contaminated. Use a lint-free cloth to clean any contaminants from the transfer belt surface.
- The connections into CL3 (ITB unit separation clutch) and CL3 (ITB cleaning roller separation clutch) have been switched at the clutches, not on the PCB. (This typically shows a light black print on the page.)
- The toner cartridge is getting low on toner.
- The paper you are using does not meet HP paper specifications.
- The toner density setting is not adjusted correctly.
- The internal mirror or optics are contaminated.
- The laser scanner is damaged.

- The document scanner needs to be recalibrated.
- There is a problem in the contact image sensor.
- There is a problem in the formatter.

Full-page ghosting

Full-page ghosting occurs when an image prints in full color on one page, but a faded copy of it is also seen on the following page.

- Make sure that the top spring in the ITB drawer is properly connected.
- Replace the ITB.
- Ensure operation of the ITB cleaning roller clutch (CL3).
- If the imaging drum is near end of life, replace it.
- If the toner cartridge is near end of life, replace it.

Gray background

- The paper does not meet HP paper specifications or is stored improperly.
- The printer operating environment does not meet specifications.
- The toner density is set incorrectly.
- The toner cartridge is defective.
- The inside of the printer is dirty.
- The printer is printing on envelope seams.
- Move the text to an area without seams.

Irregular, raised spots or stray toner

- Toner collected on the transfer belt can cause smudging on the back of the page. Smudges commonly appear on the edges of pages after the media size is changed. The belt is self-cleaning and the smudging will normally clear within a few pages.
- Toner on the edge of the media is usually caused by toner collecting on the paper guides. Inspect the paper guides and clean with a lint-free cloth if necessary.
- Do not re-feed paper that has already been through the printer. Re-feeding paper that has already passed through the printer can contaminate the fuser causing stray toner defects.
- Paper may have blobs after warm-up. Print a few pages to resolve the anomaly

Light, dark, or faded print

- The toner density setting is wrong.
- The toner cartridge is low.
- The transfer roller is defective.
- The paper does not meet HP paper specifications or is stored improperly.
- The laser scanner is defective.
- The high-voltage power supply is defective.

Light black or no black print

- The black toner cartage is empty. Replace it.
- The HVPS may be faulty.
- The connections into CL2 and CL3 have been switched at the clutches, not on the PCB.

Loose toner

- Dirt is in the printer.
- The toner cartridge is defective.
- Paper is too smooth.
- The driver setting for the paper type is wrong.
- The fuser is defective.

Mottled or marbled output

Determine which toner color needs to be replaced by looking at the secondary colors on the self-test page.

- If red and green are mottled, replace yellow.
- If red and blue are mottled, replace magenta.
- If green and blue are mottled, replace cyan.

Random black spots

- The paper you are using does not meet HP paper specifications.
- You are printing on the wrong side of the paper.
- The printer requires cleaning with a cleaning page.
- The toner cartridge is damaged.

Sharkskin

- Use paper with lower resistivity.
- Make sure the humidity and temperature are within specifications.
- Do not use Automatic Duplex mode. Duplex manually or not at all.

Single color missing

- Check for a defective light pipe sensor. If defective, replace the toner level sensor.
- Remove the toner cartridge and manually check the level of toner in the toner cartridge.

Sunburn

The imaging drum might have been exposed to light. Symptoms of sunburn are streaked or blurred lines across the length of the page (side-to-side on portrait, or top-to-bottom on landscape).

- Print 50 to 100 pages on the imaging drum to remove the sunburn.
- If sunburn symptoms are still occurring, allow the imaging drum to sit in a dark place for 2 to 3 days.
- If sunburn is severe (the symptoms don't go away), replace the imaging drum.

CAUTION

Do not expose the drum to light for more than 15 seconds. The drum is light sensitive, and exposure to light can cause permanent damage.

Toner smear

- There is dirt on the paper.
- The fusing rollers are dirty.
- The paper does not meet HP specifications.
- The toner cartridge is defective.
- The fusing assembly is defective.
- There is dirt in the printer.
- The static eliminator is dirty or is not grounded, allowing a static charge to remain on a page.
- The DC controller PCA is defective.

Vertical lines or streaks

- Check for a leak where light might be entering the printer.
- Check for circumferential scars on the photosensitive drum. If scars are present, replace the drum cartridge if the line goes through all colors.
- Check for circumferential scars on the upper fusing roller. If scars are present, replace the upper fusing roller if the line goes through all colors.
- Remove the imaging drum cartridge and inspect main charger or imaging drum for a contaminate such as a fiber if the line goes through all colors.

Note

Do not expose the drum to light for more than 15 seconds. The drum is light sensitive, and exposure to light can cause permanent damage.

Vertical black lines

- The toner cartridge is defective.
- The toner cartridge is not seated properly.
- The fuser entrance is dirty.
- The fuser has scratches on it.

- This may be a repetitive defect. If so, the lines will be repeated at a consistent interval down the page.
- The printer needs to be cleaned.
- There is a problem in the heating element.

Vertical white lines

- If white lines or streaks appear only in the black areas of the printed media, print several configuration pages to clear the anomaly. If this does not clear the problem, check the sleeve surface to confirm the defect, then replace the black toner cartridge.
- If white lines appear only in a particular color, try printing several configuration pages to clear the error. If the error does not clear, check the sleeve surface to confirm the defect, then replace the defective toner cartridge.
- There is a lack of toner or the toner cartridge is faulty.
- There is dirt in the laser path.
- The fuser is defective.
- A mirror in the laser scanner is dirty.

Wavy characters

Mechanical instability in the scanner mechanism or the optics can cause wavy characters.

- Reprint the job to ensure that the problem persists.
- If the failure remains, replace the scanner assembly.

Overhead transparency defects

Overhead transparencies may display any of the image quality defects shown in the previous samples. In addition, because transparencies are pliable while in the print path, they are subject to being marked by the media-handling components.

Note

Allow transparencies to cool at least 30 seconds before handling them.

- Make sure that “transparency” is checked as the media type in the Paper Tab in the printer drive. Also, make sure that the media input tray is correctly configured for transparencies. When Transparency is selected as the media type and ColorSmart II is selected on the Color tab, the printer will use a color treatment optimized for projection.
- If transparencies show lines and creases in the media or in the printed output, compare the defect against the repetitive defect ruler (see the service manual) to help isolate the cause to a particular component.
- Check that the transparencies meet the specifications listed in the *HP LaserJet Family Paper Specification Guide.*
- If the transparencies have spots or smudges, reprint them being careful not to touch the surface of the media. Skin oils can contaminate transparencies, causing spots and smudges.
- Small random dark areas on the trailing edge of solid fill pages may be caused by transparencies sticking together in the face up bin. Try printing the job in smaller batches.
- Send transparencies only to the face-down output bin.

Transparencies created on the printer may look rough, but they can still be used successfully on reflective-type (portable) transparency projectors.

Dull or dark transparencies

If the transparency colors are dull or dark, ensure the transparencies meet the specifications for this printer (part number C2934A for letter, and C2936A for A4).

Incorrect image on transparencies

This might occur even though the correct media is loaded in the correct tray. Toner might not adhere to the media and an image might show up on pages where it isn't meant to appear. (See "Full page ghosting" on page 162.)

When this occurs on transparencies, the connections for the ITB cleaning roller (clutch 3) and for the secondary transfer roller (clutch 4) might be reversed.

Repetitive defects on transparencies

Overhead transparencies that have repetitive defects spaced 131 mm (5.2 in) apart indicate a defect on the upper fuser roller.

1 Turn the printer off and unplug the printer, allow 30 minutes for the fuser to cool, and remove the fuser.

CAUTION

Make sure to allow 30 minutes before removing the fuser. The fuser will be hot.

2 Turn the fuser gears and inspect the surface of the upper fusing roller. If the roller has surface defects (gouges), replace the fusing assembly.

Streaking on transparencies

If the transparencies have streaks, this could be due to condensed wax from the toner making its way onto the fuser assembly rollers during the fusing process. Try cleaning the fuser rollers using the following process:

1. Saturate a corner of a lint-free, static-free wipe with isopropyl alcohol.
2. Open the alternate path door (the small door) at the back of the printer.
3. Place the printer into calibration mode by opening and then closing the large door at the rear of the printer, or by pulling a drawer open, and then quickly closing it.
4. While the printer is calibrating, the fuser rollers are rolling. Place the wipe up against each roller in turn, keeping it in place for five to ten seconds.

Repetitive defects troubleshooting

Repetitive defects are defects that occur on the page. Most repetitive defects are caused by problems with one of the following:

- Developer roller
- Charge roller
- Cleaning roller
- Transfer roller
- Fuser
- Imaging drum
- Transfer belt

See the service manual for the repetitive defect ruler. See page 172 for the defect spacing chart.

CAUTION

Do not expose the imaging drum to light, and be careful not to scratch or get fingerprints on the drum surface during cleaning. Do not blow on the imaging drum.

Imaging drum defects

Causes:

- Damage such as scratches or dents on the imaging drum. These usually appear as black or white marks on the page.
- Paper dust adhering to the imaging drum. These usually appear as white marks in the dark printed areas of the page.
- Exposure of portions of the imaging drum to light. This causes light sections in the printed output. The life of the imaging drum is shortened by exposure to light.

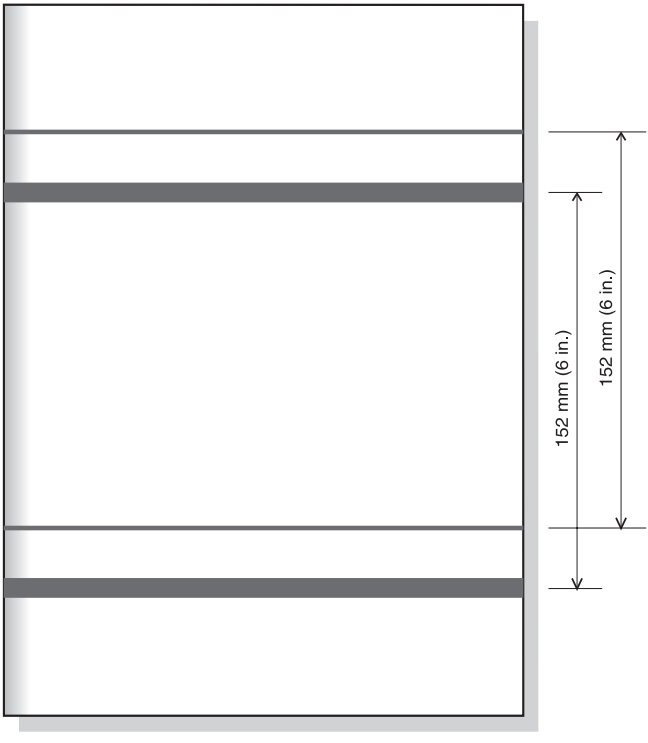
Actions:

- Print at least four configuration pages to determine if the defect repeats in the same horizontal orientation.
- Inspect the imaging drum for scratches, dents, or other damage. Replace if needed.

- If the problem is dust, remove the dust with isopropyl alcohol applied with a lint-free, static-free wipe. Try this only if the print defect is unacceptable and the only other alternative is replacing the imaging drum.
- Defects caused by exposure to light might clear up over time. If severe, replace the imaging drum.

Defect spacing chart

Consumable	Roller	Distance
Drum	Charge roller	40 mm (1.6 in)
	Imaging drum	152 mm (6 in)
Developer sleeve	Black developer	37 mm (1.5 in)
	Color developer	30 mm (1.2 in)
Fuser		131 mm (5.2 in)
ITB	ICL roller	40 mm (1.6 in)
Transfer roller		53 mm (2.1 in)



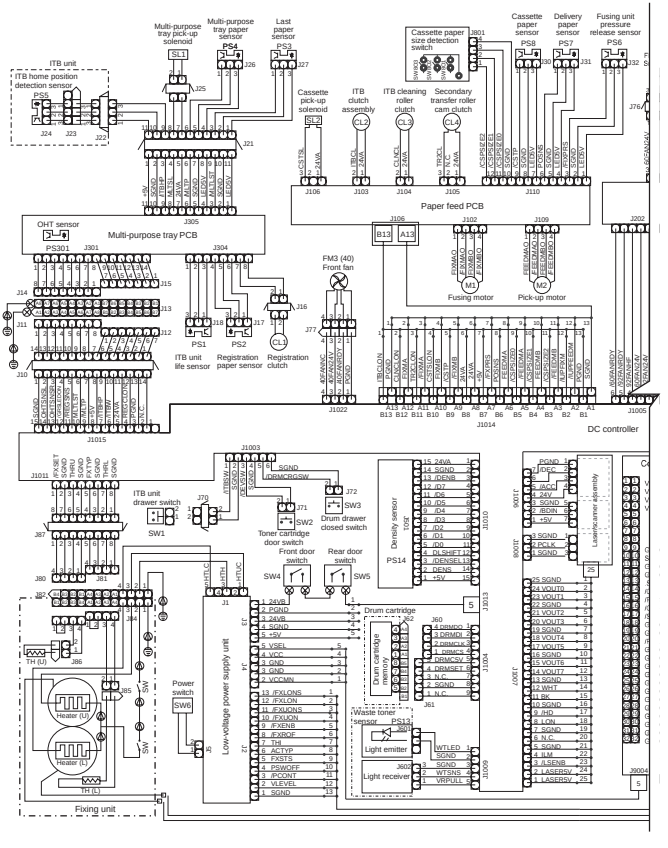
Imaging drum exposed to light (not to scale)

10 Wiring diagrams

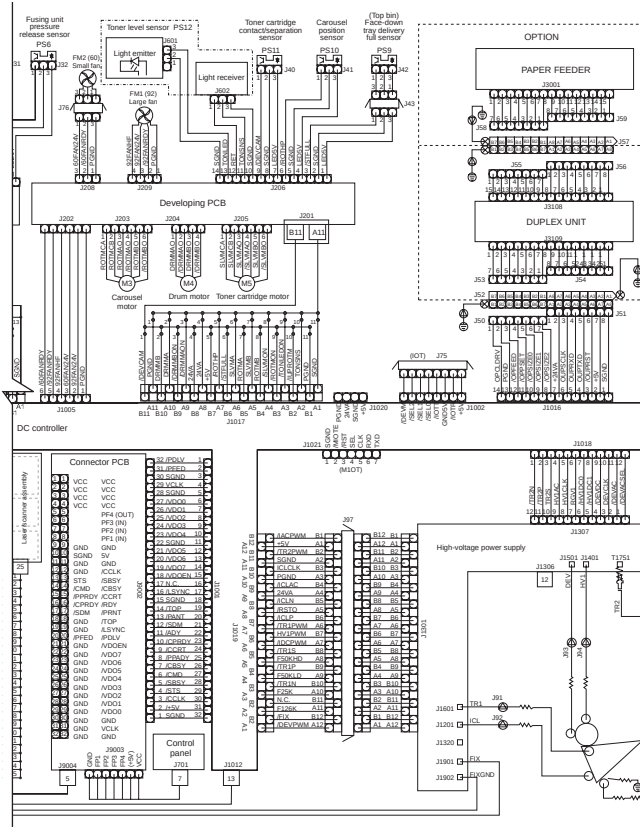
Overview

This chapter provides wiring diagrams.

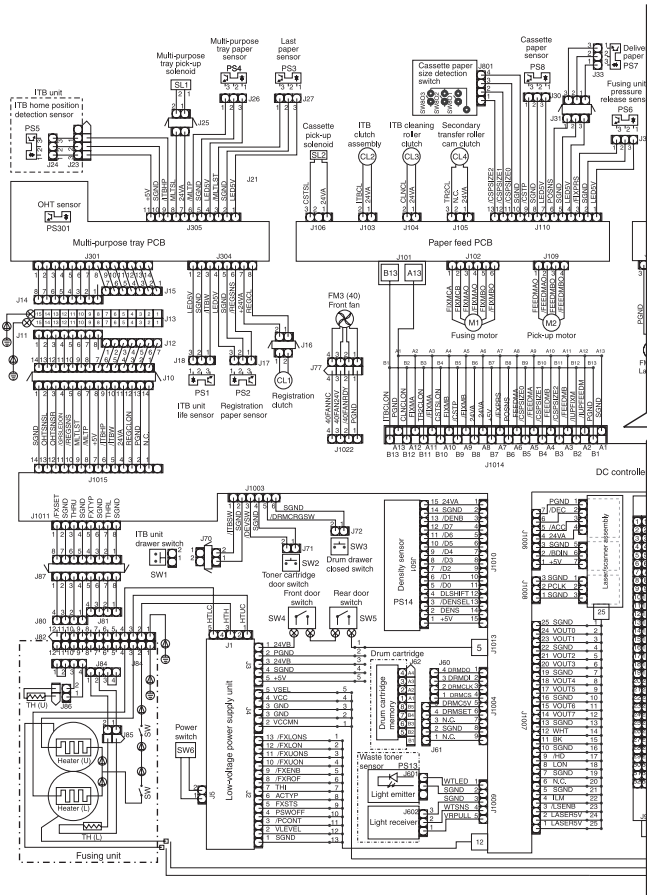
Wiring Diagrams



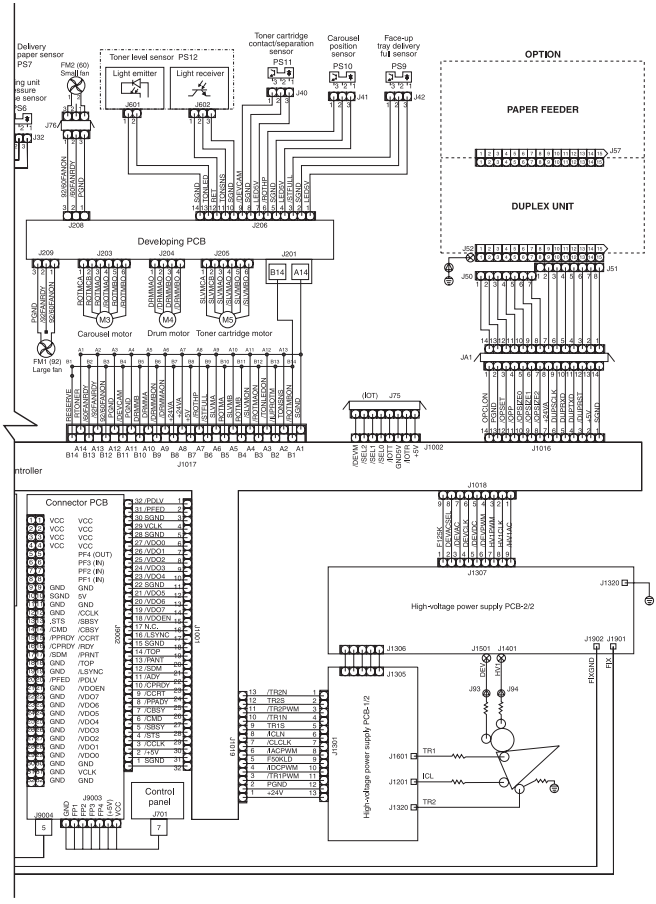
Wiring diagram for printer serial number xxG... and below (1 of 2)



Wiring diagram for printer serial number xxG... and below (2 of 2)



Wiring diagram for printer serial number xxH... and above (1 of 2)



ntroller

10

Wiring diagram for printer serial number xxH... and above (2 of 2)

11 Services and support resources

Overview

This chapter provides information on obtaining training, support, and materials.

How to get training

Lecture/lab training (U.S. only)

Service technicians who want individual, hands-on training can attend regularly scheduled lecture/lab training classes. These classes are offered throughout the country. To receive the latest schedule, call HP FIRST at (800) 333-1917, or see the HP website (www.hp.com/go/resellertraining) and request document ID number 9104. The latest schedule will immediately be sent to the fax number of your choice. Class schedule and registration information can also be obtained by calling the centralized registration center at (512) 434-1520.

Self-paced training

The self-paced training kits include the following:

- video tape
- service manual
- student guide
- support CD-ROM
- pocket guide
- paper specification guide

Training kit	Part number
NTSC video version	C4084-67901
PAL video version	C4084-67902

Support resources—North America

HP Customer Care Reseller Sales and Service Support Center

The HP Customer Care Reseller Sales and Service Support Center is available for technical support to assist service technicians. The support center can be reached at (800) 544-9976 (U.S.).

To retrieve service notes

Authorized dealers and HP customer engineers [CEs] ONLY

1. Dial (800) 333-1917 (U.S.) from any touch-tone phone.
2. Select (1) for technical support.
3. Select (3) for a password customer.
4. Enter the password: 737842.
5. Follow the voice prompts to enter a document ID number or to select the index.
6. Follow the voice prompts to enter your fax number or the fax number of your customer.

Note

Delivery time depends on the length and complexity of the document.

HP end-user support options

Local support assistance

The user's first source of assistance should be their local dealer or service center. HP continuously provides local computer dealers and service centers with the latest information regarding products and services. To locate the nearest authorized dealer or service center, call (800) 243-9816 (U.S.) or (800) 387-3867 (Canada).

Printer drivers by mail

To obtain printer drivers, contact the software application manufacturer. HP distributes printer drivers for a few of the most popular applications. Call (805) 257-5565, 6 days a week, 24 hours a day (closed Sundays). Shipping and handling charges may apply on some printer drivers.

Electronic information services

For 24-hour access to information via modem, we suggest:

- **Internet –**Printer drivers and product and support information can be obtained from the HP Customer Care Online at http://www.hp.com/cposupport/eschome.html or from the HP anonymous file transfer protocol (FTP) site. The site is available to anyone with FTP access to the Internet. Access through the World Wide Web is available at URL http://www.hp.com/go/support or http://www.hp.com/go/resellertraining/.

Telephone assistance—in warranty

Call the HP Customer Care Center at (208) 323-2551 Monday through Friday from 6 am to 10 pm (Mountain Time) free of charge during the warranty period. However, your standard long-distance telephone charges still apply. Have your system nearby and your serial number ready when calling.

Telephone assistance—post-warranty

Post-warranty telephone assistance is available to answer your product usage questions at the HP Customer Care Center. Call (900) 555-1500 ($2.50 per minute, U.S. only) or call (800) 999-1148 ($25 per call, Visa or MasterCard, U.S. and Canada) Monday through Friday from 7 am to 6 pm and Saturday from 9 am to 3 pm (Mountain Time). *Charges begin only when you connect with a support technician. *Prices subject to change.*

Hardware repair services

To locate a local authorized repair center for hardware repair needs, call (800) 243-9816. HP also offers a variety of service contract options to complement the standard warranty by calling (800) 743-8308 (U.S.) or (800) 268-1221 (Canada).

Note

Additional service telephone numbers are listed at the back of this manual.

Ordering parts

Field replaceable and accessory part numbers are found in Chapter 8 of this manual. Replacement parts can be ordered from HP's Commercial Hardcopy Support Division-America (CHSD-A) or HP's Commercial Hardcopy Support Division-Europe (CHSD-E).

Use only accessories specifically designed for this printer. Accessories can be ordered from an authorized service or support provider. See "Ordering related documentation and software" on page 188.

By phone:

- Commercial Hardcopy Support Division-America (CHSD-A) (1)(800) 227-8164 (US only)
- Commercial Hardcopy Support Division-Europe (CHSD-E) (49) (070) 3114-2253

By mail:

Hewlett-Packard Company Commercial Hardcopy Support Division-America 8050 Foothills Blvd. Roseville, CA 95678	Hewlett-Packard Company Commercial Hardcopy Support Division-Europe Wolf-Hirth Straße 33 D-7030 Böblingen, German

Note

Use only accessories specifically designed for this printer.

Spare parts and consumable supplies for this product will be made available for at least 5 years after production has stopped.

Ordering consumables

Consumables may be ordered directly from Hewlett-Packard. The telephone numbers for ordering consumables are:

- U.S. (800) 538-8787
- Canada (800) 387-3154; Toronto (416) 671-8383
- United Kingdom 0734-441212
- Other local telephone numbers may also be available

Ordering field replaceable units

The HP Color LaserJet 4500 printer is designed to be repaired by replacing field replaceable units (FRUs). Part numbers are located in chapter 8 and can be ordered from CHSD-A or CHSD-E.

Exchange and recycling program

HP offers remanufactured assemblies for some selected parts.

- **Printer and Parts**—Design for recycling has been incorporated into this printer and its accessories. The number of materials has been kept to a minimum while ensuring proper functionality and high product reliability. Dissimilar materials have been designed to separate easily. Fasteners and other connections are easy to locate, access, and remove with common tools. High-priority parts have been designed to be accessed quickly for efficient disassembly and repair. Plastic parts have been primarily designed in two colors to enhance recycling options. A few small parts are colored specifically to highlight customer access points.

  HP provides a product return system for customers in Germany. Many of the functional parts are recovered, tested, and reused as fully warranted service parts. Used parts are not placed into new product manufacturing. The remainder of the product parts are recycled, if possible. For product return information, call **(49) (070) 3114-1936 or Fax (49) (070) 3114-4195.**
- **Paper**—This printer is suited for the use of recycled papers when the paper meets the guidelines outlined in the *HP LaserJet Printer Family Paper Specification Guide*. This printer is suited for the use of recycled paper according to DIN 19 309. The on-line user guide is provided on compact disc, which allows the same high-quality information to be provided without consuming the large quantities of energy and natural resources required to produce traditional paper manuals.

Ordering related documentation and software

The table below shows where to order related documentation and software. Telephone numbers for the various sources are:

- Commercial Hardcopy Support Division-America (CHSD-A) (1)(800) 227-8164 (US only)
- Commercial Hardcopy Support Division-Europe (CHSD-E) (49) (070) 3114-2253
- HP Distribution Center (HPD) (1) (661) 257-5565. Fax: (1) (805) 257-6995

Related documentation and software

Description	Part number	CHSD-A	CHSD-E	HPD
HP LaserJet Printer Family Paper Specification Guide	5090-3392			X
HP Peripherals Connectivity Solutions Guide	5091-6453E	X	X	
HP JetDirect Print Server JetAdmin Setup Guide	5969-3412	X	X	
HP JetDirect Print Server Administrator's Guide	5967-9991	X	X	
Technical reference package	5021-0377	X		
HP Color LaserJet Printer Drivers Disk	C4084-60122			
HP Color LaserJet 4500, 4500 N documentation bundle (quick reference guide and getting started guide)	C4084-99021	X		
HP Color LaserJet 4500 DN documentation bundle (quick reference guide and getting started guide)	C4094-99020	X		

Related documentation and software

Description	Part number	CHSD-A	CHSD-E	HPD
HP Color LaserJet 4500, 4500 N, 4500 DN Printer Service Manual	C4084-91077	X		
HP Color LaserJet 4500 Series Printer Service and Support CD-ROM	C4084-60110	X	X	
HP Color LaserJet 4500 Series Printer Online User Guide	C4084-90937	X		

Technical assistance

HP FIRST

HP FIRST (Fax Information Retrieval Support Technology) is a phone-in fax service providing technical information for HP LaserJet users as well as service personnel. Receiving a fax requires a type 3 facsimile machine or fax card. Service related information includes:

- Service notes (HP authorized dealers)
- Application notes
- Product data sheets
- Material Safety Data Sheets (MSDS)
- Typeface and accessory information
- Printer support software information
- Toner information
- Driver request form and software matrix

HP First numbers

HP FIRST Fax will deliver detailed troubleshooting information on common software and troubleshooting tips for your HP product. Call from any touch tone phone and request up to three documents per call. These documents will be sent to the fax of your choice. In Canada, call (800) 333-1917; in the United States, call (800) 333-1917.

Support resources—Asia Pacific and Europe

HP Customer Care Centers in Asia Pacific

Country	Customer Care Center	Service Center
Singapore	65-2725300	
Hong Kong	800-96-7729	
Vietnam	84 8 8234530 84 8 8294485	84 4 9431718
Indonesia		62-21-3518788
Philippines	632-829-5387 632-829-5388 632-829-5389	
Thailand		66-2-661 3900
Malaysia		6-03-7953788 Fax: 6-03-7954423
India	91-11-6826035	
China	86-10-5645858	86-10-62351040-6554 86-10-62385047
Taiwan	886-2-2717-0055	
Korea	02-3270-0700 02-3270-0740	
Australia	03-8877-8000	

A Acronyms and abbreviations

Acronyms and abbreviations

AC	Alternating current
AUTOCONT	Automatic continue
BNC	A 10-Base 2 connector used with coaxial cables
CFG	Configuration on control panel
DC	Direct current
DCPS	Direct current power supply
MS-DOS	Disk operating system
DIMM	Dual inline memory module
DPI	Dots per inch
DTR	Data terminal ready
DTR line	Data terminal ready line
ECU	Engine control unit
EP	Electrophotographic
FRU	Field replacement unit
FTP	File transfer protocol
HP FIRST	Hewlett-Packard fax information retrieval support technology
HP-GL/2	Hewlett-Packard graphics language
HTML	Hypertext markup language
HV	High voltage
HVPS	High-voltage power supply
I/O	Input/output
IR	Infrared
IrDA	Infrared Data Association
IRQ	Interrupt request
ITB	Intermediate transfer belt
JEIDA	A type of memory module
LAN	Local area network
LED	Light-emitting diode
LC pickup roller	Lower-cassette pick-up roller

Acronyms and abbreviations (continued)

MB	Megabyte
MEM	Memory
MIO	Modular input/output
MP pickup roller	Multipurpose tray pick-up roller
MP Tray	Multipurpose tray
MSDS	Material safety data sheets
NVRAM	Nonvolatile random-access memory
Ohm	A unit of measure of electrical resistance
OHT	Overhead transparency
PCA	Printed-circuit assembly
PCB	Printed-circuit board
PCL	Printer command language
PC pickup roller	Paper-cassette pickup roller
PJL	Printer job language
PS	Photosensor
RAM	Random-access memory
RIP	Raster image process
ROM	Read-only memory
SIMM	Single inline memory module
SL	Solenoid
SPEC	Specification
TCP/IP	Transmission control protocol/Internet protocol
TS	Thermoswitch
UNIX	Network operating system using TCP/IP protocol
URL	Universal resource locator
VDC	Volts direct current
VFD	Vacuum fluorescent display

Index

Symbols

+24 Vdc power supply 66
+3.3 Vdc power supply 66
+5 Vdc power supply 66

A

abbreviations 193–194
AC power supply 66
accessories
  See also consumables
acronyms 193–194
adjusting color balance 149
air filters 104
alphabetical parts list 134–141
assemblies
  PCB 124
assistance, technical 190

B

bidirectional parallel cable
  pin configuration 73
bidirectional parallel interface 72

C

cable
  IEEE-1284 compliant parallel 74
  maximum I/O cable lengths 74
  See parallel cable
chart
  defect spacing 172
checklist
  pre-troubleshooting 2
cold reset 48
  control panel message 8
color checks 144
color matching 148
color printing
  adjust density setting 150, 151
  adjusting color balance 149
  control options 147
  controlling color 149
  customizing 146
  detail option 146
  grayscale 147
  halftones 146
  matching colors 147
  PANTONE® colors 148
  screen match 147
  vivid color 147
color selection process 146
color variations 144
  common causes 145
colored paper, printing on 85
common fasteners 110
computer interface
  configuring 75
configuration
  EIO 70
  menu 76
configuring
  computer interface 75
  LocalTalk 71
  parallel cable pin 73
consumable, locations
  air filters 104
  fuser 104

imaging drum cartridge 104
intermediate transfer belt 104
toner cartridges 104
transfer roller 104
consumables 106
approximate replacement intervals 92
drum kit 92
error messages 93
fuser kit 93
identifying 104
ordering 186
percent of life remaining 76
replacing 93
toner cartridges 92
transfer kit 93
control panel messages 4–39
alphabetical messages 4–19
numerical messages 20–39
CPU, RISC processor 71

D

DC power supply 66
defect spacing chart 172
density settings 76
developer, test 59
diagnostics
formatter 56
diagnostics mode
accessing diagnostics 55
diagrams
wiring 176–179
display panel
error messages 4–39
documentation, ordering 188
door sensor test 62
drum, test 59

E

engine test 63
location of test button 63
enhanced I/O (EIO)
configuration 70
envelopes
gray background 97
improving print quality 97
printing on 86
error messages
consumables 92
interpreting 92
event log 76
exchange and recycling program 187

F

fasteners, common 110
field replaceable units
ordering 186
fonts 105
fonts, ordering 105
formatter
diagnostics 56
fuser 104

G

glossy paper, printing on 85
grayscale, printing in 147

H

hardware repair services 184
heavy paper, printing on 85
high-voltage
power supply 68
HP Customer Care Center 184, 191
HP First Fax 190

HP JetDirect
  print servers 70
HP LaserJet Family Paper
  Specification Guide 82
HP Parts Direct Ordering 103
HP Planet Partners 98
HPColorSmart II 147

I

I/O 69
  LocalTalk 71
  menu 76
identifying consumables 104
IEEE-1284 compliant
  parallel cables 74
image
  defect details 155–167
  defect table 153–154
imaging drum
  cartridge 104
input 69
input/output
  bidirectional parallel interface 72
input/output cards
  description 105
  part numbers 105
installed options 76
interfaces, printer
  parallel cable pin configuration 73
intermediate transfer belt 104
internet 184

L

labels, printing on 86, 87
letterhead, printing on 87
LocalTalk I/O 71
LocalTalk interface 71
log, event 76

M

Macintosh
  LocalTalk interface 71
media
  capacity 80
  colored paper 85
  envelopes 86
  glossy paper 85
  heavy paper 85
  labels 87
  letterhead 87
  non-supported 83
  paper curl 89
  printing on special media 83
  recycling 88
  selecting 82
  sizes 80
  specifications 79, 82
  transparencies 83, 84
  types to avoid 83
  weights 80
memory 76, 105
  ordering 105
  part numbers 105
  product description 105
menu
  configuration 76
  I/O 76
  printing 76
  service 50
messages, control panel 4–39

N

network connectivity 105
NVRAM 56
NVRAM initialization
  instructions 64
  results 64
NVRAM values, changing 47

O

options, installed 76
ordering
  consumables 186
  documentation 188
  field replaceable units 186
  fonts 105
  I/O cards 105
  memory 105
  other manuals iv
  software 188
output 69
overcurrent protection
  overvoltage protection 67
overvoltage 67

P

panel overlays 107
PANTONE® colors 148
paper
  jams, locating 42
  paper curl 89
  weights 81
paper jams 40
  locating 42
paper path
  checklist 44
  test 58
paper trays 76
paper-size
  settings 61
parallel cable
  pin configuration 73
parallel cables
  connectors 74
  part numbers 74
parallel interface
  bidirectional, IEEE-1284 72
parts 105–107
  developing rotary assembly 122
  internal components 116–121
parts list
  alphabetical 134–141
parts, for the HP LaserJet 4500 series 112
path
  sensors and switches 60
path sensors 60
PCB
  assembly 124
  locations 124
power supply
  +24 Vdc 66
  +3.3 Vdc 66
  +5 Vdc 66
  AC 65, 66
  DC 65, 66
  high-voltage 65, 68
print
  density test 144
print servers
  HP JetDirect 70
printer
  cable pin configuration 73
  configuration page, interpreting 75
  information 75
  interfaces 73
  line voltage 2
  messages 93
  operation commands 47
  options 106
  protecting 2
  register adjust 47
  storage 2
  testing 47
  troubleshooting 2

printer drivers
  obtaining 184
  ordering 184
printing
  engine test 63
  menu 76
  on envelopes 86
  on glossy paper 85
  on labels 86, 87
  on letterhead 87
  on transparencies 83
product
  part numbers 105
  servicing 184
  support 183
program
  exchange 187
  recycling 187
protection
  overcurrent 67
  systems 68

R

recycled paper 88
refill statement 100
registration
  numbers, setting 53
  page 52
registration page
  printing 51
repair services
  hardware 185
replaceable parts 105–107
reset, cold 48
ROM CRC 56

S

screen match (sRGB) 147
screws 110
security 76
selecting media 82
self-paced training kits 182
sensor
  door sensor test 62
  path 60
  status 62
service
  product data sheets 190
  service notes 190
  telephone numbers, North America 203
  websites 202
service mode
  access 48
  menu 47
  menu map 49
  service menu items 50
  service menu, access 48
service notes, retrieving 183
settings, density 76
software, ordering 188
support
  assistance 184
  information, obtaining 184
support resources 183
  Asia Pacific 191
supported products iv
systems, protection 68

T

technical assistance 190
test 56
  developer 59
  door sensor 62
  DRAM 56
  drum 59
  execute tests 56
  NVRAM 56

on fault 56
paper path 58
repeat 56
SRAM 1 56
SRAM 2 56
testing
sensors 47
toner
cartridge replacement 92
toner cartridge 104
refill statement 100
replacement intervals 93
resolving problems 94
toner cartridges, potential issues
banding 94
character voids 94
toner cracking 95
toner image
post-image transfer 96
transferring 96
toner supplies 106
training
class schedules 182
obtaining 182
self-paced training kits 182
transfer
belt, intermediate 104
roller 104
transparencies
printing on 84
tray capacities 81
trays
capacities 80
paper 76
troubleshooting
See also paper jams 42
engine test 63
image defects 153
image formation 144
paper jams 42
printer 2

W

warranty
assistance 184
in-warranty 184
post-warranty 185
wiring diagrams 176–179

Service Websites

HP Customer Care Online

Software drivers, support documentation, and frequently asked questions

http://www.hp.com/go/support

HP Technical Training (North America)

Classes and schedules

http://www.hp.com/go/resellertraining

Parts

Parts information

http://outfield.external.hp.com/spi/welcome.htm

For support resources in Europe and Asia Pacific, see page 191.

Service telephone numbers

All numbers listed are for North America only.

HP Customer Care Reseller Sales and Service Support Center

Dealer pre/post sales and service support

(800) 544-9976 *U.S. Only* **(800) 363-6594** *Canada*

Customer Care Center

User technical-support questions, LaserJet fax

(208) 323-2551

HP FIRST – Fax Information Retrieval System

Service notes, sales information, user help, software information

(208) 344-4809 **(800) 333-1917** *U.S. Only*

Customer Information Center

Sales dealer locations, literature, and specifications

(800) 752-0900 *U.S. Only*

HP Driver Distribution Center

Printer drivers and software application notes orders

(970) 339-7009 *U.S. Only*

Customer Support Sales Center

Authorized repair locations

(800) 243-9816 *U.S. Only*

Parts Direct Ordering / CHSD-A

Service parts, supplies, and accessories orders

(800) 227-8164 *U.S. Only*

Parts Identification

Service part number identification

(916) 783-0804

HP Customer Care Center

Online technical assistance

(800) 477-5526 *HP Only*

Corvallis Customer Service Center

Express exchange and customer return services

(916) 785-1200

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